

# **EXHIBIT 31**

Chadwick Hauff, Vol 1

June 08, 2017

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UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN JOSE DIVISION

IN RE SEAGATE TECHNOLOGY LLC  
LITIGATION,

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CASE NO. 5:16-CV-00523-JCS

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CONSOLIDATED ACTION,

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VIDEOTAPED DEPOSITION OF CHADWICK HAUFF

San Francisco, California

Thursday, June 8, 2017

Reported by: Ashley Soevyn, CSR No. 12019

Job No. 2242

Pages 1 - 153

Chadwick Hauff, Vol 1

June 08, 2017

<p style="text-align: right;">Page 114</p> <p>1 that the drives would not fail within the warranty</p> <p>2 period?</p> <p>3 A Promise? No.</p> <p>4 Q Did you consider the warranty a promise</p> <p>5 that if a drive did fail within the warranty period,</p> <p>6 you would get a replacement?</p> <p>7 A That was my understanding.</p> <p>8 Q Turning to paragraph 153, it says, "Days</p> <p>9 prior to purchase, Mr. Nelson read the Barracuda</p> <p>10 data sheet in the 2012 Barracuda web page, including</p> <p>11 the AFR data and the statement that drive is perfect</p> <p>12 for best -- and best fit for RAID and NAS system."</p> <p>13 Is that correct?</p> <p>14 A You said "Mr. Nelson."</p> <p>15 Q I'm sorry.</p> <p>16 A But otherwise --</p> <p>17 Q Mr. Hauff.</p> <p>18 A I'm sorry, I'm going to read that again.</p> <p>19 Q I apologize. Let me make the record</p> <p>20 clear. That was my mistake.</p> <p>21 So Paragraph 153, "Days prior to purchase</p> <p>22 Mr. Hauff read the Barracuda data sheet and the 2012</p> <p>23 Barracuda web page, including the AFR data and the</p> <p>24 statement that the drive is 'perfect for' and 'best</p> <p>25 fit' for RAID and for NAS systems."</p>	<p style="text-align: right;">Page 116</p> <p>1 any other drives?</p> <p>2 A No.</p> <p>3 Q Do you recall whether the Seagate AFR</p> <p>4 data indicated a figure less than 1 percent?</p> <p>5 A Say that again.</p> <p>6 MR. POPOVIC: Can you read that back?</p> <p>7 (Record read.)</p> <p>8 THE WITNESS: I believe so.</p> <p>9 BY MR. POPOVIC:</p> <p>10 Q Do you have any reason to believe that</p> <p>11 figure is not correct?</p> <p>12 MR. PIERCE: Objection to form.</p> <p>13 THE WITNESS: No.</p> <p>14 BY MR. POPOVIC:</p> <p>15 Q What statements did you read about the</p> <p>16 drive being perfect for and best fit for RAID and</p> <p>17 NAS systems?</p> <p>18 A Can you rephrase that question?</p> <p>19 Q In paragraph 153, it's alleged that you</p> <p>20 read the Barracuda data sheet in 2012 Barracuda web</p> <p>21 page, and that included statements that the drive is</p> <p>22 perfect for and best for RAID and that is NAS</p> <p>23 systems.</p> <p>24 What in the Barracuda data sheet did you</p> <p>25 read that says the drive is perfect for and best fit</p>
<p style="text-align: right;">Page 115</p> <p>1 A I believe that's true.</p> <p>2 Q What statements did you -- what</p> <p>3 particular statements did you read that related to</p> <p>4 the AFR data and that the drive is perfect for and</p> <p>5 best fit for RAID and NAS systems?</p> <p>6 A The AFR data, I believe, was part of a</p> <p>7 spec listing.</p> <p>8 Q Where did you see that spec listing?</p> <p>9 A I believe on one of the websites.</p> <p>10 Q Was it on Seagate's websites?</p> <p>11 A I would guess that it was.</p> <p>12 Q You're not sure?</p> <p>13 A I'm not positive. It was Seagate's or</p> <p>14 Amazon's or one of the other websites I was using</p> <p>15 for research.</p> <p>16 Q Did you believe it to be a statement by</p> <p>17 Seagate?</p> <p>18 A Yes.</p> <p>19 Q What about the AFR data did you consider</p> <p>20 important?</p> <p>21 A That it wasn't out of the norm.</p> <p>22 Q What do you consider to be the norm?</p> <p>23 A I think all of them -- any hard drive</p> <p>24 data showed the AFR was less than like 1 percent.</p> <p>25 Q Did you compare Seagate's AFR data for</p>	<p style="text-align: right;">Page 117</p> <p>1 for RAID and NAS systems?</p> <p>2 A I don't recall exactly verbatim what I</p> <p>3 read. I remember reading that these were, for lack</p> <p>4 of a better term, general-purpose drives for</p> <p>5 personal use, which would include, you know, best</p> <p>6 fit for NAS desktop, home servers, that sort of</p> <p>7 thing.</p> <p>8 Q Do you recall where you read that?</p> <p>9 A I don't. I would say it was, again, one</p> <p>10 of the Amazon or Seagate or Newegg or TigerDirect</p> <p>11 websites.</p> <p>12 Q Do you remember when you read it?</p> <p>13 A Prior to purchasing.</p> <p>14 Q Did you keep a record of any of the</p> <p>15 statements that you read prior to purchasing?</p> <p>16 A No.</p> <p>17 Q Did you print any of them out?</p> <p>18 A No.</p> <p>19 Q Do you know how AFR is derived?</p> <p>20 A No.</p> <p>21 Q Did you use your drives for desktop RAID?</p> <p>22 A I don't know what desktop RAID means.</p> <p>23 Q If we go back to Exhibit B, which is</p> <p>24 after the numbers paragraphs, I believe you</p> <p>25 testified previously that one of the statements you</p>

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June 08, 2017

<p style="text-align: right;">Page 150</p> <p>1 A No.</p> <p>2 Q Have you spoken with any other class</p> <p>3 members?</p> <p>4 A No.</p> <p>5 Q Have you ever been involved in another</p> <p>6 class action?</p> <p>7 A Yes.</p> <p>8 Q What other class action?</p> <p>9 A I don't know. I periodically, you know,</p> <p>10 have gotten a post card or e-mail saying you're part</p> <p>11 of some class action unless you opt out or</p> <p>12 something.</p> <p>13 Q And you've participated in some of those?</p> <p>14 A No. I've generally not responded.</p> <p>15 Q Have you ever responded and participated?</p> <p>16 A Oh, no. No.</p> <p>17 Q So you've been notified about other class</p> <p>18 actions but you've never had any role in them beyond</p> <p>19 getting a notification; is that correct?</p> <p>20 A That's correct.</p> <p>21 Q Is there anything that we have not talked</p> <p>22 about today that you think is relevant to your</p> <p>23 claims?</p> <p>24 MR. PIERCE: Objection. Form.</p> <p>25 THE WITNESS: I don't know.</p>	<p style="text-align: right;">Page 152</p> <p>1 I, CHADWICK HAUFF, do hereby declare under</p> <p>2 penalty of perjury that I have read the foregoing</p> <p>3 transcript; that I have made any corrections as</p> <p>4 appear noted, in ink, initialed by me, or attached</p> <p>5 hereto; that my testimony as contained herein, as</p> <p>6 corrected, is true and correct.</p> <p>7 EXECUTED this _____ day</p> <p>8 of _____,</p> <p>9 20____, at _____, _____.</p> <p style="text-align: center;">(City) (State)</p> <p>10</p> <p>11</p> <p>12</p> <p>13 _____</p> <p>14 CHADWICK HAUFF</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
<p style="text-align: right;">Page 151</p> <p>1 BY MR. POPOVIC:</p> <p>2 Q Is there anything we have not talked</p> <p>3 about today that you think is relevant to your role</p> <p>4 as a plaintiff in this case?</p> <p>5 A I don't know.</p> <p>6 MR. POPOVIC: That's all the questions I</p> <p>7 have.</p> <p>8 MR. PIERCE: Would you have purchased the</p> <p>9 Seagate hard drives if you knew of the way that they</p> <p>10 performed after you purchased them?</p> <p>11 THE WITNESS: No.</p> <p>12 MR. PIERCE: And did you rely on</p> <p>13 representations by Seagate in the marketing</p> <p>14 materials that you reviewed before purchasing the</p> <p>15 hard drives?</p> <p>16 THE WITNESS: Yes.</p> <p>17 MR. PIERCE: I have no more questions.</p> <p>18 THE VIDEOGRAPHER: This now concludes the</p> <p>19 videotaped deposition of Chadwick Hauff on</p> <p>20 June 8th, 2017. We are now going off the record.</p> <p>21 The time is 2:30 p.m.</p> <p>22</p> <p>23 (TIME NOTED: 2:30 p.m.)</p> <p>24</p> <p>25</p>	<p style="text-align: right;">Page 153</p> <p>1 I, the undersigned, a Certified Shorthand</p> <p>2 Reporter of the State of California, do hereby</p> <p>3 certify:</p> <p>4 That the foregoing proceedings were taken</p> <p>5 before me at the time and place herein set forth;</p> <p>6 that any witnesses in the foregoing proceedings,</p> <p>7 prior to testifying, were duly sworn; that a record</p> <p>8 of the proceedings was made by me using machine</p> <p>9 shorthand, which was thereafter transcribed under my</p> <p>10 direction; further, that the foregoing is a true</p> <p>11 record of the testimony given.</p> <p>12 I further certify I am neither financially</p> <p>13 interested in the action nor a relative or employee</p> <p>14 of any attorney or party to this action.</p> <p>15 IN WITNESS WHEREOF, I have this date</p> <p>16 subscribed my name.</p> <p>17</p> <p>18 Dated: _____</p> <p>19</p> <p>20</p> <p>21</p> <p>22 <u>Ashley Soevyn</u></p> <p>23 ASHLEY SOEVYN</p> <p>24 CSR No. 12019</p> <p>25</p>

# **EXHIBIT 32**

James Hagey, Vol 1

July 24, 2017

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UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN JOSE DIVISION

IN RE SEAGATE TECHNOLOGY LLC  
LITIGATION,

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CASE NO. 5:16-CV-00523-JCS

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CONSOLIDATED ACTION,

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VIDEOTAPED DEPOSITION OF JAMES HAGEY

San Francisco, California

Monday, July 24, 2017

Reported by: Ashley Soevyn, CSR No. 12019

Job No. 2259

Pages 1 - 94

James Hagey, Vol 1

July 24, 2017

<p style="text-align: right;">Page 58</p> <p>1 Q Correct.</p> <p>2 A Three to seven years, in my opinion.</p> <p>3 Q Okay. And going to the second sort of</p> <p>4 subsection. It says that the Barracuda was -- it</p> <p>5 says that you believed that the Barracuda was highly</p> <p>6 unlikely to fail in any given year, at least until</p> <p>7 the drive wore out after substantial use. Can you</p> <p>8 tell me -- or, is that correct?</p> <p>9 A That is correct.</p> <p>10 Q And can you tell me what caused that</p> <p>11 belief?</p> <p>12 A My experience with previous hard drives.</p> <p>13 Q Okay. And can you tell me, in your</p> <p>14 opinion, what does "highly unlikely to fail in any</p> <p>15 given year" mean?</p> <p>16 A It means that if I buy a hard drive, I</p> <p>17 don't expect it to fail for many, many years,</p> <p>18 typically.</p> <p>19 Q In many, many?</p> <p>20 A In more than three to five.</p> <p>21 Q Okay. And can you tell me what you mean</p> <p>22 by -- or, sorry. And can you tell me in your</p> <p>23 opinion what "substantial use" means?</p> <p>24 A Daily.</p> <p>25 Q Daily for how long?</p>	<p style="text-align: right;">Page 60</p> <p>1 A I can't say, because, primarily, I dealt</p> <p>2 with drives that were customer drives. So I would</p> <p>3 be working on a customer's computer, with a Seagate</p> <p>4 hard drive, for unrelated issues besides hard</p> <p>5 drives.</p> <p>6 Q And you'd mentioned earlier that you used</p> <p>7 to buy about one or two drives a year for personal</p> <p>8 use, correct?</p> <p>9 A Yes.</p> <p>10 Q And that some of those were Seagate hard</p> <p>11 drives, correct?</p> <p>12 A Yes.</p> <p>13 Q Your experience with those, in your</p> <p>14 experience with those, did they last? Or, on</p> <p>15 average, how long did they last?</p> <p>16 A To my knowledge, I still have at least</p> <p>17 one that's still running. And they all lasted at</p> <p>18 least five years.</p> <p>19 Q The one that's still running, how old is</p> <p>20 that one?</p> <p>21 A I want to say it's about four years old.</p> <p>22 And it's an external.</p> <p>23 Q And for those drives, are they all</p> <p>24 external hard drives?</p> <p>25 A No.</p>
<p style="text-align: right;">Page 59</p> <p>1 A For three to five, six, years.</p> <p>2 Q And does that mean 24 hour --</p> <p>3 A Seven, yes, ma'am. I never turn my</p> <p>4 computer off.</p> <p>5 Q And after about how many years would you</p> <p>6 expect a hard drive to fail? Sorry, I think you</p> <p>7 responded to this, but just for the record.</p> <p>8 A I would expect a hard drive not to fail</p> <p>9 before five years, typically.</p> <p>10 Q Okay. Going to subsection three, it says</p> <p>11 that you believed that the internal Barracuda would</p> <p>12 last just as long as comparable hard drives on the</p> <p>13 market, if not longer; is that correct?</p> <p>14 A Yes.</p> <p>15 Q And can you tell me what the basis of</p> <p>16 your belief for that statement was?</p> <p>17 A Because of what I read on the Seagate</p> <p>18 website. And on the box. And my previous</p> <p>19 experience with Seagate.</p> <p>20 Q Okay. And can you tell me what you mean</p> <p>21 by your previous experience with Seagate?</p> <p>22 A Just that I've used Seagate hard drives</p> <p>23 before. And that up until I bought this one, they</p> <p>24 seemed to be pretty reliable.</p> <p>25 Q And how long did those drives last?</p>	<p style="text-align: right;">Page 61</p> <p>1 Q Okay. Can you tell me about how many you</p> <p>2 have that are internal and how many you have that</p> <p>3 are external?</p> <p>4 A I have one external Seagate. I can't</p> <p>5 tell you what the drive in my home computer is,</p> <p>6 because it came from Dell.</p> <p>7 Q Okay. In a statement that we've gone</p> <p>8 through, it says that you believed that the</p> <p>9 Barracuda would last longer than a comparable hard</p> <p>10 drive. What made you think that?</p> <p>11 A Because of Seagate's data sheet and their</p> <p>12 website.</p> <p>13 Q What about the data sheet or website made</p> <p>14 you think that it would last longer?</p> <p>15 A Well, Seagate was saying that it was a</p> <p>16 very reliable drive. At the time, it was a large --</p> <p>17 I think it was the largest drive they were selling.</p> <p>18 So it was desirable because of its size and its --</p> <p>19 it's stated reliability.</p> <p>20 Q And earlier you kind of mentioned that</p> <p>21 there are some differences that a manufacturer might</p> <p>22 make between sort of advertising and then actual</p> <p>23 representations about the drive. Can you tell me</p> <p>24 where the sort of division between what's just</p> <p>25 advertising and what its actual assertion is, in</p>

James Hagey, Vol 1

July 24, 2017

<p style="text-align: right;">Page 94</p> <p>1 I, the undersigned, a Certified Shorthand 2 Reporter of the State of California, do hereby 3 certify: 4 That the foregoing proceedings were taken 5 before me at the time and place herein set forth; 6 that any witnesses in the foregoing proceedings, 7 prior to testifying, were duly sworn; that a record 8 of the proceedings was made by me using machine 9 shorthand, which was thereafter transcribed under my 10 direction; further, that the foregoing is a true 11 record of the testimony given. 12 I further certify I am neither financially 13 interested in the action nor a relative or employee 14 of any attorney or party to this action. 15 IN WITNESS WHEREOF, I have this date 16 subscribed my name. 17 18 Dated: _____ 19 20 21 <i>Ashley Soevyn</i> 22 ASHLEY SOEVYN 23 CSR No. 12019 24 25</p>	



# **EXHIBIT 33**

Dudley Lane Dortch IV, Vol 1

July 12, 2017

Page 1

UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION

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IN RE:

SEAGATE TECHNOLOGY, LLC  
LITIGATION,

Case No.  
3:16-cv-00523 JCS

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VIDEOTAPED

DEPOSITION OF: DUDLEY LANE DORTCH, IV

DATE: Wednesday, July 12, 2017

TIME: 9:55 a.m through 3:37 p.m.

LOCATION: Magna Legal Services  
960 Morrison Drive  
Charleston, South Carolina

TAKEN BY: Attorneys for the Defendant  
Seagate Technology, LLC

COURT REPORTER: MADONNA M. FARRELL  
Registered Professional Reporter  
Certified Livenote Reporter  
CaseViewNet Realtime Reporter

Dudley Lane Dortch IV, Vol 1

July 12, 2017

<p style="text-align: right;">Page 94</p> <p>1 <b>Exhibit B, that you recall reviewing at the time?</b></p> <p>2 MR. AXLER: Objection. Asked and</p> <p>3 answered. Misstates prior testimony.</p> <p>4 MS. McLEAN: That's a question. I'm</p> <p>5 not stating any testimony.</p> <p>6 THE DEPONENT: No, not specifics.</p> <p>7 BY MS. McLEAN:</p> <p>8 <b>Q. Do you recall reviewing annualized failure</b></p> <p>9 <b>rate?</b></p> <p>10 A. I do remember seeing that. I do remember --</p> <p>11 and not just in this particular data sheet, but</p> <p>12 Seagate has always been very low. I do remember</p> <p>13 that in the history.</p> <p>14 <b>Q. In particular, with the purchase of these</b></p> <p>15 <b>drives, did you consider that piece of information?</b></p> <p>16 A. I think I looked at any abnormalities for</p> <p>17 that. But honestly, Seagate's data sheets have</p> <p>18 always said less than 1 percent. I can't think of</p> <p>19 one that has ever been over less than 1 percent, on</p> <p>20 any of these that I've ever seen. Which stands to</p> <p>21 reason. You have a good drive, right?</p> <p>22 <b>Q. Right.</b></p> <p>23 <b>So my question to you is, did you review</b></p> <p>24 <b>that information in particular with regard to your</b></p> <p>25 <b>purchase of the ST3000DM001?</b></p>	<p style="text-align: right;">Page 96</p> <p>1 extent it calls for a legal conclusion. You</p> <p>2 can answer.</p> <p>3 THE DEPONENT: In my specific</p> <p>4 application, I was looking for a drive to</p> <p>5 fit my need, which was a network array, a</p> <p>6 network storage array, or a NAS, and a RAID</p> <p>7 configuration.</p> <p>8 And based on that, on the data sheet</p> <p>9 that we just looked at, on the front page of</p> <p>10 that, it says that this drive was</p> <p>11 suitable -- maybe it says something</p> <p>12 different. Let's see. It says that falls</p> <p>13 under the Best-Fit Applications.</p> <p>14 BY MS. McLEAN:</p> <p>15 <b>Q. And you're looking at the first page of</b></p> <p>16 <b>Exhibit B?</b></p> <p>17 A. Yes.</p> <p>18 <b>Q. Were those the only statements that you</b></p> <p>19 <b>considered to be material and which you relied on</b></p> <p>20 <b>in purchasing the drives?</b></p> <p>21 A. No.</p> <p>22 <b>Q. What other statements did you consider to be</b></p> <p>23 <b>material?</b></p> <p>24 A. I think we just went over that. It would</p> <p>25 have been the data sheet for that particular drive.</p>
<p style="text-align: right;">Page 95</p> <p>1 A. I probably did note it, just as I'm looking</p> <p>2 at it today.</p> <p>3 <b>Q. You don't recall specifically?</b></p> <p>4 A. I would have recalled anything out of the</p> <p>5 norm, and I don't remember that being a factor --</p> <p>6 that that looks like a normal failure rate to me.</p> <p>7 So I would have checked that box on my -- it's</p> <p>8 okay.</p> <p>9 <b>Q. In Paragraph 236 --</b></p> <p>10 A. Which exhibit? 8 still?</p> <p>11 <b>Q. Yeah, we're still in Exhibit 8.</b></p> <p>12 <b>In Paragraph 236, you say you reviewed the</b></p> <p>13 <b>Barracuda Data Sheet. Specifically, you read the</b></p> <p>14 <b>statements on the data sheet regarding the</b></p> <p>15 <b>suitability of the drive for RAID and NAS?</b></p> <p>16 A. Yes.</p> <p>17 <b>Q. You considered these statements to be</b></p> <p>18 <b>material and relied on them?</b></p> <p>19 A. Yes.</p> <p>20 <b>Q. Is that correct?</b></p> <p>21 A. Yes.</p> <p>22 <b>Q. What do you mean by your -- you considered</b></p> <p>23 <b>these statements to be material and relied on them?</b></p> <p>24 A. In my specific --</p> <p>25 MR. AXLER: Objection. Compound to the</p>	<p style="text-align: right;">Page 97</p> <p>1 Voltage tolerance. I mean, this is just the same</p> <p>2 stuff we looked at -- we talked about just a minute</p> <p>3 ago. Operating temperature, that's good. I mean,</p> <p>4 there's some other things on here that I would look</p> <p>5 at, just like I looked at it today, when buying</p> <p>6 something for somebody today, either at work or at</p> <p>7 home. There's still pertinent information on this</p> <p>8 data sheet.</p> <p>9 <b>Q. Okay. Well, in a legal context, I'm asking</b></p> <p>10 <b>you about what, in particular, you considered and</b></p> <p>11 <b>relied on in buying the Seagate drives.</b></p> <p>12 A. Uh-huh.</p> <p>13 <b>Q. In the Complaint, Paragraph 236, you mention</b></p> <p>14 <b>only the suitability of the drive for RAID and NAS.</b></p> <p>15 <b>Are you saying now that there were other factors</b></p> <p>16 <b>that you considered to be material and relied on</b></p> <p>17 <b>that are not listed in Paragraph 236?</b></p> <p>18 MR. AXLER: Objection. Asked and</p> <p>19 answered. You can answer.</p> <p>20 THE DEPONENT: In particular, the</p> <p>21 Best-Fit Applications -- this drive fit what</p> <p>22 I needed it to do under Best-Fit</p> <p>23 Applications. Did I look at other data on</p> <p>24 here to make a determination that there was</p> <p>25 anything that would cause me to think this</p>

Dudley Lane Dortch IV, Vol 1

July 12, 2017

<p style="text-align: right;">Page 198</p> <p>1 believe you testified to some earlier</p> <p>2 communications with your counsel --</p> <p>3 A. Uh-huh.</p> <p>4 Q. -- have you done anything else related to</p> <p>5 the litigation?</p> <p>6 A. No. Nope.</p> <p>7 Q. Have you spoken with any of the other class</p> <p>8 representatives?</p> <p>9 A. No.</p> <p>10 Q. And I believe you earlier testified you</p> <p>11 don't know anybody else personally, either online</p> <p>12 or in person, who's experienced failures with these</p> <p>13 drives, correct?</p> <p>14 A. Right. With these particular drives, no, I</p> <p>15 don't know of anyone that's had issues.</p> <p>16 Q. Is there anything that we have not talked</p> <p>17 about that you think is relevant to your claims in</p> <p>18 this case?</p> <p>19 A. No. I really -- I would have never dreamed</p> <p>20 some dead hard drives would bring this sort of</p> <p>21 paperwork. I'm looking at this stack of papers,</p> <p>22 thinking, My gosh, this is crazy. But, no, I</p> <p>23 don't.</p> <p>24 MS. McLEAN: Okay. I have no further</p> <p>25 questions.</p>	<p style="text-align: right;">Page 200</p> <p>1 CERTIFICATE OF REPORTER</p> <p>2 I, Madonna M. Farrell, Registered</p> <p>3 Professional Reporter and Notary Public in and for</p> <p>4 the State of South Carolina, do hereby certify that</p> <p>5 the deponent, DUDLEY LANE DORTCH, IV, was duly</p> <p>6 sworn by me to testify to the truth, and that the</p> <p>7 above deposition, Pages 5 through 202, inclusive,</p> <p>8 was recorded stenographically by me and transcribed</p> <p>9 through computer-aided transcription by me to the</p> <p>10 best of my ability.</p> <p>11 I FURTHER CERTIFY that the foregoing</p> <p>12 transcript is a true and correct transcript of the</p> <p>13 testimony given by the said witness at the time and</p> <p>14 place specified.</p> <p>15 I FURTHER CERTIFY that I am neither attorney</p> <p>16 or counsel for, nor related to or employed by any</p> <p>17 of the parties to the action in which this</p> <p>18 deposition is taken, or financially interested in</p> <p>19 this action.</p> <p>20 IN WITNESS WHEREOF, I have set my hand and</p> <p>21 seal this 25th of July, 2017.</p> <p>22 <i>Madonna Farrell</i></p> <p>23 Madonna M. Farrell</p> <p>24 Registered Professional Reporter</p> <p>25 Notary Public</p> <p>My commission expires</p> <p>August 20, 2025</p>
<p style="text-align: right;">Page 199</p> <p>1 MR. AXLER: I have no questions. We'll</p> <p>2 reserve the right to read and sign.</p> <p>3 VIDEOGRAPHER: This concludes the</p> <p>4 deposition of Dudley Lane Dortch, IV. We</p> <p>5 are off the record at 3:36 p.m. We are off</p> <p>6 the record.</p> <p>7 (The deposition concluded at 3:36 p.m.)</p> <p>8 (Off-the-record conference.)</p> <p>9 (Off the videotape record.)</p> <p>10 MS. McLEAN: We will be ordering a</p> <p>11 transcript and a copy of the video.</p> <p>12 MR. AXLER: For Plaintiffs, Noah Axler,</p> <p>13 we will order a copy of the transcript.</p> <p>14 Format yet to be decided. And we're going</p> <p>15 to decide on whether we want the video or</p> <p>16 not. We'll let you know.</p> <p>17 COURT REPORTER: Thank you.</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: right;">Page 201</p> <p>1 VERIFICATION OF DEPONENT</p> <p>2 CASE: IN RE SEAGATE TECHNOLOGY, LLC</p> <p>3 I, DUDLEY LANE DORTCH, IV, have read the</p> <p>4 foregoing deposition consisting of 202 pages which</p> <p>5 was reported by Madonna M. Farrell, Registered</p> <p>6 Professional Reporter and notary public in and for</p> <p>7 the State of South Carolina on July 12, 2017.</p> <p>8 I find the transcript of this deposition to</p> <p>9 be a true and accurate transcript according to my</p> <p>10 testimony on that date with the exception of</p> <p>11 corrections as listed on the attached correction</p> <p>12 sheet, which was filled in by me.</p> <p>13</p> <p>14</p> <p>15</p> <p>16 DUDLEY LANE DORTCH, IV</p> <p>17</p> <p>18</p> <p>19</p> <p>20 , 2017</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>

# **EXHIBIT 34**

<p>Page 1</p> <p>1 UNITED STATES DISTRICT COURT 2 NORTHERN DISTRICT OF CALIFORNIA 3 SAN JOSE DIVISION 4 5 IN RE SEAGATE TECHNOLOGY LLC 6 LITIGATION, 7 _____ 8 9 CASE NO. 5:16-CV-00523-JCS 10 11 CONSOLIDATED ACTION, 12 _____ 13 14 VIDEOTAPED DEPOSITION OF NIKOLAS MANAK 15 San Francisco, California 16 Tuesday, June 20, 2017 17 18 19 20 21 22 23 Reported by: Ashley Soevyn, CSR No. 12019 24 Job No. 2248 25 Pages 1 - 144</p>	<p>Page 3</p> <p>1 A P P E A R A N C E S 2 3 For the Plaintiffs 4 HAGENS BERMAN SOBOL SHAPIRO LLP 5 BY: BENJAMIN SIEGEL 6 Attorney at Law 7 715 Hearst Avenue 8 Suite 202 9 Berkeley, California 94710 10 E-mail: bens@hbsslaw.com 11 Phone: (510) 725-3000 12 13 For the Defendant Seagate Technology LLC 14 SHEPPARD MULLIN RICHTER &amp; HAMPTON LLP 15 BY: LIEN PAYNE 16 -and TENAYA RODEWALD 17 Attorneys at Law 18 Four Embarcadero Center 19 17th Floor 20 San Francisco, California 94111 21 E-mail: lpayne@sheppardmullin.com 22 Phone: (415) 434-9100 23 24 25 ALSO PRESENT: Jason Sayler, Videographer</p>
<p>Page 2</p> <p>1 UNITED STATES DISTRICT COURT 2 NORTHERN DISTRICT OF CALIFORNIA 3 SAN JOSE DIVISION 4 5 IN RE SEAGATE TECHNOLOGY LLC 6 LITIGATION, 7 _____ 8 9 CASE NO. 5:16-CV-00523-JCS 10 11 CONSOLIDATED ACTION, 12 _____ 13 14 Videotaped Deposition of NIKOLAS MANAK 15 taken on behalf of defendants, at Four Embarcadero 16 Center, 17th Floor, San Francisco, California, 17 beginning at 10:14 a.m. and ending at 3:33 p.m. on 18 Tuesday, June 20, 2017, before ASHLEY SOEVYN, 19 Certified Shorthand Reporter No. 12019. 20 21 22 23 24 25</p>	<p>Page 4</p> <p>1 I N D E X 2 3 VIDEOTAPED DEPOSITION OF NIKOLAS MANAK 4 EXAMINATION BY: PAGE 5 6 MS. PAYNE 10 7 8 MR. SIEGEL 140 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25</p>

Page 133

1 How did you start the process to return  
2 your hard drive to Seagate?  
3 A I believe there was an online forum at  
4 the time on Seagate's website, where you could enter  
5 the serial number, report a problem, and they would  
6 exchange the drive under warranty for you.  
7 Q Did you have to enter the serial number  
8 of the hard drive on that forum?  
9 A I don't remember. Probably. But I don't  
10 remember.  
11 MS. PAYNE: This is Exhibit 35, which is  
12 an order confirmation.  
13 (Exhibit 35 marked for identification.)  
14 BY MS. PAYNE:  
15 Q Do you recognize this document?  
16 A Yes.  
17 Q What is this document?  
18 A This is an order confirmation for my  
19 replacement hard drive.  
20 Q Do you see a serial number listed in this  
21 document?  
22 A Yes.  
23 Q And this is the serial number for the  
24 hard drive you returned to Seagate?  
25 A Yes, I believe so.

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1 MS. PAYNE: This is Exhibit 36, which is  
2 a USPS confirmation.  
3 (Exhibit 36 marked for identification.)  
4 THE WITNESS: Okay.  
5 BY MS. PAYNE:  
6 Q Do you recognize this document?  
7 A Yes.  
8 Q What does this document show?  
9 A I'm pretty sure this is the receipt for  
10 sending in my defective hard drive for replacement.  
11 MS. PAYNE: This is Exhibit 37, which is  
12 an e-mail from Seagate customer service.  
13 (Exhibit 37 marked for identification.)  
14 THE WITNESS: Okay.  
15 BY MS. PAYNE:  
16 Q Do you recognize this document?  
17 A Yes.  
18 Q So what does this document show?  
19 A This shows that my replacement hard drive  
20 from Seagate was delayed due to low inventory, and  
21 they will ship when one is available.  
22 Q But Seagate did provide you with a  
23 replacement hard drive?  
24 A Yes.  
25 Q Was the replacement hard drive the same

Page 135

1 type of hard drive that you had returned to Seagate?  
2 A Yes. It was the same model number.  
3 Q Was it a 3 terabyte Barracuda?  
4 A Yes.  
5 Q You testified earlier that when the hard  
6 drive failed you lost movies. What other types of  
7 information did you lose?  
8 A Digitally archived copies of my music  
9 collection and a few photos. I can't remember  
10 exactly of what, but some of my photo collection was  
11 on there, and I hadn't recently synchronized it with  
12 what was on my personal computer.  
13 Q Did you read any statements by Seagate  
14 about AFR prior to purchasing the Seagate internal 3  
15 terabyte hard drive?  
16 A Yes, it was on their data sheet.  
17 Q Did you read any statements by Seagate  
18 about the use of 3 terabyte Barracuda hard drives in  
19 RAID before purchasing the hard drives?  
20 A Yes.  
21 Q Where did you read those statements?  
22 A On the data sheet.  
23 Q Did you read any statements by Seagate  
24 about the use of 3 terabyte Barracuda hard drives in  
25 NAS before purchasing the hard drives?

Page 136

1 A Yes, I did.  
2 Q Did you rely on any of those statements?  
3 A Yes. Both RAID and NAS were my intended  
4 usage so I relied on both of those statements.  
5 Q Did you rely on statements about AFR?  
6 A Yes, I did. I knew I would be using RAID  
7 zero, so there was always the possibility of data  
8 loss. So I relied on their very, very low AFR,  
9 which would mean it was very unlikely I would suffer  
10 any data loss.  
11 Q Are you aware that the second  
12 consolidated amended complaint states that you read  
13 the data sheet but it does not specifically state  
14 that you relied on statements about AFR, RAID or  
15 NAS?  
16 A No, I'm not aware of that.  
17 Q We're finished with documents.  
18 What relief are you seeking in this  
19 lawsuit?  
20 A I am going to defer to the lawyers on  
21 what would be appropriate relief.  
22 Q Is there a different amount that you  
23 would have paid for the Seagate 3 terabyte internal  
24 Barracudas knowing how long the drive lasted?  
25 MR. SIEGEL: Objection as to form. Calls

Nikolas Manak, Vol 1

June 20, 2017

<p style="text-align: right;">Page 142</p> <p>1 MS. PAYNE: No further questions.</p> <p>2 THE VIDEOGRAPHER: This marks the end to</p> <p>3 DVD No. 2 of 2 in the videotaped deposition of</p> <p>4 Nikolas Manak and concludes today's testimony in the</p> <p>5 matter of the Seagate Technology consolidated action</p> <p>6 litigation.</p> <p>7 The time is 3:33 p.m. and we're off the</p> <p>8 record.</p> <p>9</p> <p>10 (TIME NOTED: 3:33 p.m.)</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: right;">Page 144</p> <p>1 I, the undersigned, a Certified Shorthand</p> <p>2 Reporter of the State of California, do hereby</p> <p>3 certify:</p> <p>4 That the foregoing proceedings were taken</p> <p>5 before me at the time and place herein set forth;</p> <p>6 that any witnesses in the foregoing proceedings,</p> <p>7 prior to testifying, were duly sworn; that a record</p> <p>8 of the proceedings was made by me using machine</p> <p>9 shorthand, which was thereafter transcribed under my</p> <p>10 direction; further, that the foregoing is a true</p> <p>11 record of the testimony given.</p> <p>12 I further certify I am neither financially</p> <p>13 interested in the action nor a relative or employee</p> <p>14 of any attorney or party to this action.</p> <p>15 IN WITNESS WHEREOF, I have this date</p> <p>16 subscribed my name.</p> <p>17</p> <p>18 Dated: _____</p> <p>19</p> <p>20</p> <p>21 <u>Ashley Soevyn</u></p> <p>22 ASHLEY SOEVYN</p> <p>23 CSR No. 12019</p> <p>24</p> <p>25</p>
<p style="text-align: right;">Page 143</p> <p>1 I, ASHLEY SOEVYN, do hereby declare under</p> <p>2 penalty of perjury that I have read the foregoing</p> <p>3 transcript; that I have made any corrections as</p> <p>4 appear noted, in ink, initialed by me, or attached</p> <p>5 hereto; that my testimony as contained herein, as</p> <p>6 corrected, is true and correct.</p> <p>7 EXECUTED this _____ day</p> <p>8 of _____,</p> <p>9 20____, at _____, _____.</p> <p style="text-align: center;">(City) (State)</p> <p>10</p> <p>11</p> <p>12</p> <p>13 _____</p> <p>14 ASHLEY SOEVYN</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	



# EXHIBIT 35

1 SHEPPARD, MULLIN, RICHTER & HAMPTON LLP  
A Limited Liability Partnership  
2 Including Professional Corporations  
NEIL A.F. POPOVIC, Cal. Bar No. 132403  
3 ANNA S. McLEAN, Cal. Bar No. 142233  
TENAYA RODEWALD, Cal. Bar No. 248563  
4 LIEN H. PAYNE, Cal. Bar No. 291569  
JOY O. SIU, Cal. Bar. No. 307610  
5 Four Embarcadero Center, 17<sup>th</sup> Floor  
San Francisco, California 94111-4109  
6 Telephone: 415.434.9100  
Facsimile: 415.434.3947  
7 Email: npopovic@sheppardmullin.com  
amclean@sheppardmullin.com  
8 trodewald@sheppardmullin.com  
lpayne@sheppardmullin.com  
9 jsiu@sheppardmullin.com

10 Attorneys for Defendant SEAGATE TECHNOLOGY, LLC

11  
12 UNITED STATES DISTRICT COURT  
13 NORTHERN DISTRICT OF CALIFORNIA  
14 SAN FRANCISCO DIVISION  
15

16 IN RE SEAGATE TECHNOLOGY, LLC  
LITIGATION

17  
18 CONSOLIDATED ACTION  
19  
20

Case No. 3:16-cv-00523 JCS

**DECLARATION OF KARL SCHWEISS  
IN SUPPORT OF SEAGATE  
TECHNOLOGY LLC'S OPPOSITION TO  
PLAINTIFFS' MOTION FOR CLASS  
CERTIFICATION**

1 I, Karl Schweiss, hereby declare as follows:

2 1. I am an employee of Seagate Technology LLC (“Seagate” or the  
3 “Company”). I have reviewed the documents discussed in my declaration and conferred with  
4 other employees at Seagate. I make the following statements based on my personal knowledge of  
5 Seagate’s practices and procedures and the results of my review and investigation. If called as a  
6 witness, I could and would competently testify thereto.

7 2. I joined Seagate in 1989, when the Company acquired the disk drive  
8 division of CDC Drives, for which I worked at the time. In 2001, I joined the Marketing and  
9 Communications Department as a Technical Writer. I am currently employed as a Senior  
10 Technical Writer. My duties remained the same in both roles but I am responsible for a higher  
11 volume of work in the senior position. My duties include: (1) drafting product manuals for core,  
12 desktop, enterprise, and notebook products, (2) maintaining and updating product manuals, and (3)  
13 working with customer support to ensure the most current version of each product manual is  
14 available on Seagate’s website.

15 3. I am based in Seagate’s facility in Oklahoma City, Oklahoma.

16 4. It is my understanding that Seagate hard drives with model ST3000DM001  
17 (the “Drives”) are at issue in this action. The Drives were marketed under numerous product  
18 names. The internal products (“Internal Products”) containing the Drives at issue are: Barracuda  
19 and Desktop HDD Internal Kit. The external products (“External Products”) containing the Drives  
20 at issue are: Backup Plus Desk, Backup Plus for Mac, Expansion Desk, Expansion Desk Plus,  
21 GoFlex Desk for Mac, FreeAgent GoFlex Home, FreeAgent GoFlex Desk, Business 1 Bay NAS,  
22 Business 2 Bay NAS, and Business 4 Bay NAS.

23 **Format of Draft and Finalized Product Manuals**

24 5. I am familiar with the format of finalized product manuals that are released  
25 to the public and the format of draft product manuals that are not released to the public. Released  
26 product manuals do not have redlines, while draft product manuals may have redlines.  
27 Additionally, the final version of a released product manual will only have an alphabetical  
28

1 character without numbers, while the draft version of a product manual may have numerical  
2 characters.

3 **Draft April 2011 Desktop HDD Product Manual**

4           6. I reviewed the document Plaintiffs refer to in their class certification motion  
5 with beginning Bates number FED\_SEAG0019045\_1, which I understand is a product manual for  
6 Seagate's Barracuda drives, including HDD model number ST3000DM001 dated April 2011 (the  
7 "April 2011 Draft Product Manual"). See Motion, 6:22-7:1. A true and correct copy of the April  
8 2011 Draft Product Manual is attached here as **Exhibit 1**.

9           7. I confirm the April 2011 Draft Product Manual is a draft that was never  
10 released to the public. The April 2011 Draft Product Manual, "Rev. A2," includes the number "2"  
11 and not solely alphabetical characters. Also, the April 2011 Draft Product Manual contains  
12 redlines on many of its pages. These redlines are indicated by vertical lines on the right-hand  
13 margins of these pages.

14           8. The Barracuda and Desktop HDD product manuals attached here as  
15 **Exhibits 2-16** are true and correct copies of all finalized and published product manuals for the  
16 Internal Products from January 2011 – February 2016.

17           9. The Barracuda was eventually rebranded as the Desktop HDD, as shown by  
18 the renaming of the Barracuda Product Manual to the Desktop HDD Product Manual in May 2014  
19 at Revision J. A true and correct copy is attached as **Exhibit 10**.

20 **AFR Representations in Product Manuals for Internal Products**

21           10. Based on my review of Exhibits 2–12, I can confirm that finalized product  
22 manuals for the Internal Products do not specify an Annualized Failure Rate (AFR) of less than  
23 1% based on 2,400 power on hours (POH) for the ST3000DM001 prior to January 2015.

24           11. Only after January 2015 did product manuals for the Internal Products  
25 specify an AFR of less than 1% based on 2,400 power on hours (POH) for the ST3000DM001  
26 HDDs. Page 20 of Exhibit 12, the finalized January 2015 product manual (FED\_SEAG0070909),  
27 includes such language for the ST3000DM001 for the first time.

28

1 Desktop HDD Data Sheets

2 12. **Exhibit 17** is a true and correct copy of a draft data sheet for the Desktop  
3 HDD. The draft data sheet shows edits indicating that references to AFR were removed on  
4 October 25, 2012.

5 13. **Exhibit 18** is a true and correct copy of a finalized data sheet for the  
6 Desktop HDD from December 2012 that shows AFR references no longer appeared in data sheets  
7 for the Desktop HDD as of that date. After a data sheet or product manual is finalized, there is a  
8 period of time during which old versions of these materials remain on Seagate's website until the  
9 updated version is made available.

10 **Product Manuals for External Products**

11 14. As a matter of practice at Seagate, product manuals for external products do  
12 not contain AFR representations or reference the ST number for the drive inside the product.  
13 Accordingly, product manuals for the External Products would not contain AFR representations or  
14 reference the ST3000DM001. Moreover, no product manuals for the External Products were ever  
15 published. This means the named plaintiffs who purchased the Backup Plus Desk and Backup  
16 Plus for Mac could not have: (1) viewed AFR representations for the Backup Plus Desk or Backup  
17 Plus for Mac in product manuals, or (2) determined the ST3000DM001 was inside these products  
18 after reviewing product manuals for the Backup Plus Desk or Backup Plus for Mac.

19 **Data Sheets for External Products**

20 15. As a matter of practice at Seagate, the data sheets for external products  
21 never reference the ST number for the internal drive. The ST number referred to in data sheets for  
22 external products pertains to the chassis or box number for the product. This means the data  
23 sheets for the External Products at issue here would not have referenced the ST3000DM001.

24 **Storage Solutions Guides**

25 16. The Storage Solutions Guides attached here as **Exhibits 19–27** are true and  
26 correct copies of all Storage Solutions Guides published for the United States from January 2011-  
27 February 2016.

28

1 I declare under penalty of perjury under the laws of the United States of America  
2 that the foregoing is true and correct.

3 Executed on this 5th day of January, 2018, at Oklahoma City, Oklahoma.

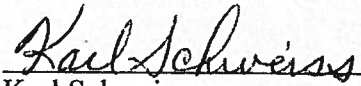
4  
5   
6 Karl Schweiss

Exhibit 17



# Desktop HDD

Data Sheet

## The Power of One

- s 3EAGATE BRINGS OVER 11 YEARS OF TRUSTED PERFORMANCE AND RELIABILITY TO THE NEWEST 3EAGATE® DESKTOP (\$\$S à NOW AVAILABLE IN CAPACITIES UP TO 14" 1
- s DOUBLE YOUR CAPACITY AND DRIVEDOWN COSTS WITH THE INDUSTRY'S FIRST 4" PER DISK HARD DRIVE TECHNOLOGY 1
- s 3!4! T 'BQ' INTERFACE OPTIMIZES BURST PERFORMANCE
- s 3EAGATE 104RAC® SERVO TECHNOLOGY DELIVERS DEPENDABLE PERFORMANCE □ EVEN WITH HARD DRIVE TRACK WIDTHS OF ONLY 1 NANOMETERS 1
- s 3EAGATE /PTI##AHE® TECHNOLOGY BOOSTS OVERALL PERFORMANCE BY AS MUCH AS 11 □ OVER THE PREVIOUS GENERATION 1
- s 8FREE 3EAGATE \$ISK71ZARD® SOFTWARE ALLOWS YOU TO INSTALL 11 11" 11" HARD DRIVE IN 7 INDOORS □ INCLUDING 30 □ WITHOUT 5(%) □ )/3 1

## Best-Fit Applications

- s DESKTOP CR ALL IN ONE 0/5
- s (OME SERVERS
- s 0#BASED GAMING SYSTEMS
- s DESKTOP 2! )\$
- s \$IRECT ATTACHED EXTERNAL STORAGE DEVICES □ \$13
- s .ETWORK ATTACHED STORAGE DEVICES □ .13





## Desktop HDD

Seagate 

Specifications	4TB <sup>1</sup>	3TB <sup>1</sup>	2TB <sup>1</sup>	1TB <sup>1</sup>	500GB <sup>1</sup>	320GB <sup>1</sup>	250GB <sup>1</sup>
Model Number	ST4000DM000	ST3000DM001	ST2000DM001	ST1000DM003	ST500DM002 <sup>2</sup>	ST320DM000 <sup>2</sup>	ST250DM000 <sup>2</sup>
Model Name	Desktop HDD	Barracuda®	Barracuda	Barracuda	Barracuda	Barracuda	Barracuda
Interface Options	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ
Performance							
Cache, Multisegmented (MB)	64	64	64	64	16	16	16
SATA Transfer Rates Supported (Gb/s)	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5
Seek Average, Read (ms)	<12	<8.5	<8.5	<8.5	<11	<11	<11
Seek Average, Write (ms)	<12	<9.5	<9.5	<9.5	<12	<12	<12
Average Data Rate, Read/Write (MB/s)	146	156	156	156	125	125	125
Max Sustained Data Rate, CD Read (MB/s)	189	210	210	210	144	144	144
Configuration/Organization							
Heads/Disks	8/4	6/3	6/3	2/1	2/1	2/1	1/1
Bytes per Sector	4096	4096	4096	4096	4096 or 512 <sup>2</sup>	4096 or 512 <sup>2</sup>	4096 or 512 <sup>2</sup>
Voltage							
Voltage Tolerance, Including Noise (5V)	+10%/–5.0%	+10%/–5.0%	+10%/–5.0%	+10%/–5.0%	+10%/–5.0%	+10%/–5.0%	+10%/–5.0%
Voltage Tolerance, Including Noise (12V)	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%
Reliability/Data Integrity							
Contact Start/Stop Cycles	—	—	—	—	50,000	50,000	50,000
Load/Unload Cycles	300,000	300,000	300,000	300,000	—	—	—
Nonrecoverable Read Errors per Bits Read, Max	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14
Annualized Failure Rate (AFR)	<4%	<4%	<4%	<4%	<4%	<4%	<4%
Power-On Hours	2400	2400	2400	2400	2400	2400	2400
Power Management							
Startup Power (A)	2.0	2.5	2.5	2.0	2.0	2.0	2.0
Operating Mode, Typical (W)	7.5	8.0	8.0	5.90	6.19	6.19	6.19
Idle2 Average (W)	3.5	5.40	5.40	3.36	—	—	—
Idle Average (W)	1.5	—	—	—	4.60	4.60	4.60
Standby Mode (W)	0.50	0.75	0.75	0.63	0.79	0.79	0.79
Sleep Mode (W)	0.50	0.75	0.75	0.63	0.79	0.79	0.79
Environmental							
Temperature							
Operating (ambient min °C)	0	0	0	0	0	0	0
Operating (drive case max °C)	60	60	60	60	60	60	60
Nonoperating (ambient °C)	–40 to 75	–40 to 70	–40 to 70	–40 to 70	–40 to 70	–40 to 70	–40 to 70
Halogen Free	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RoHS Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physical							
Height (mm/in)	26.11/1.028	26.11/1.028	26.11/1.028	20.17/0.7825	19.98/0.787	19.98/0.787	19.98/0.787
Width (mm/in)	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0
Depth (mm/in)	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787
Weight (g/lb)	650/1.43	626/1.38	626/1.38	450/0.99	415/0.92	415/0.92	415/0.92
Carton Unit Quantity	20	20	20	25	25	25	25
Cartons per Layer	40	40	40	40	40	40	40
Cartons per Pallet	8	8	8	8	8	8	8
Special Features							
Seagate OptiCache™ Technology	Yes	Yes	Yes	Yes	No	No	No
Seagate AcuTrac™ Technology	Yes	Yes	Yes	Yes	No	No	No

4 / ONE GIGABYTE OR "1" EQUALS ONE BILLION BYTES AND ONE TERABYTE OR "4" EQUALS ONE TRILLION BYTES WHEN REFERRING TO DRIVE CAPACITY

3EAGATE SHIPSTHIS DRIVE IN BOTH Q + AND  $\downarrow$  BY SECTORS 32 PART 1 LIGHT TECHNOLOGY IS INCLUDED ON Q + SECTOR DRIVES BOTH DRIVES ARE FUNCTIONAL AND PHYSICALLY EQUIVALENTS



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[illegible]

Exhibit 18



# Desktop HDD

Data Sheet

## The Power of One

- Seagate brings over 30 years of trusted performance and reliability to the new Seagate® Desktop HDDs—now available in capacities up to 4TB.
- Double your capacity and drive down costs with up to 1TB-per-disk hard drive technology.
- SATA 6Gb/s interface optimizes burst performance
- Seagate AcuTrac™ servo technology delivers dependable performance, even with hard drive track widths of only 75 nanometers.
- Seagate OptiCache™ technology boosts overall performance by as much as 45%.
- Free Seagate DiskWizard™ software allows you to install 3TB and 4TB hard drives in Windows, including XP, without UEFI BIOS.

## Best-Fit Applications

- Desktop or all-in-one PCs
- Home servers
- PC-based gaming systems
- Desktop RAID
- Direct-attached external storage devices (DAS)
- Network-attached storage devices (NAS)



## Desktop HDD



Specifications	4TB <sup>1</sup>	3TB <sup>1</sup>	2TB <sup>1</sup>	1TB <sup>1</sup>	500GB <sup>1</sup>	320GB <sup>1</sup>	250GB <sup>1</sup>
Model Number	ST4000DM000	ST3000DM001	ST2000DM001	ST1000DM003	ST500DM002 <sup>2</sup>	ST320DM000 <sup>2</sup>	ST250DM000 <sup>2</sup>
Model Name	Desktop HDD	formerly Barracuda®	formerly Barracuda	formerly Barracuda	formerly Barracuda	formerly Barracuda	formerly Barracuda
Interface Options	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ	SATA 6Gb/s NCQ
Performance							
Cache, Multisegmented (MB)	64	64	64	64	16	16	16
SATA Transfer Rates Supported (Gb/s)	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5	6.0/3.0/1.5
Seek Average, Read (ms)	<8.5	<8.5	<8.5	<8.5	<11	<11	<11
Seek Average, Write (ms)	<9.5	<9.5	<9.5	<9.5	<12	<12	<12
Average Data Rate, Read/Write (MB/s)	146	156	156	156	125	125	125
Max Sustained Data Rate, CD Read (MB/s)	180	210	210	210	144	144	144
Configuration/Organization							
Heads/Disks	8/4	6/3	6/3	2/1	2/1	2/1	1/1
Bytes per Sector	4096	4096	4096	4096	4096 or 512 <sup>2</sup>	4096 or 512 <sup>2</sup>	4096 or 512 <sup>2</sup>
Voltage							
Voltage Tolerance, Including Noise (5V)	±5%	±5%	±5%	±5%	±5%	±5%	±5%
Voltage Tolerance, Including Noise (12V)	±10%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%	+10%/–7.5%
Reliability/Data Integrity							
Contact Start/Stop Cycles	—	—	—	—	50,000	50,000	50,000
Load/Unload Cycles	300,000	300,000	300,000	300,000	—	—	—
Nonrecoverable Read Errors per Bits Read, Max	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14	1 per 10E14
Power-On Hours	2400	2400	2400	2400	2400	2400	2400
Power Management							
Startup Power (A)	2.0	2.5	2.5	2.0	2.0	2.0	2.0
Operating Mode, Typical (W)	7.5	8.0	8.0	5.90	6.19	6.19	6.19
Idle Average (W)	5.0	5.8	5.8	4.0	4.60	4.60	4.60
Standby Mode (W)	0.75	0.75	0.75	0.63	0.79	0.79	0.79
Sleep Mode (W)	0.75	0.75	0.75	0.63	0.79	0.79	0.79
Environmental							
Temperature							
Operating (ambient min °C)	0	0	0	0	0	0	0
Operating (drive case max °C)	60	60	60	60	60	60	60
Nonoperating (ambient °C)	–40 to 70	–40 to 70	–40 to 70	–40 to 70	–40 to 70	–40 to 70	–40 to 70
Halogen Free	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RoHS Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Physical							
Height (mm/in)	26.11/1.028	26.11/1.028	26.11/1.028	20.17/0.7825	19.98/0.787	19.98/0.787	19.98/0.787
Width (mm/in)	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0	101.6/4.0
Depth (mm/in)	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787	146.99/5.787
Weight (g/lb)	610/1.345	626/1.38	626/1.38	400/0.88	415/0.92	415/0.92	415/0.92
Carton Unit Quantity	20	20	20	25	25	25	25
Cartons per Pallet	40	40	40	40	40	40	40
Cartons per Layer	8	8	8	8	8	8	8
Special Features							
Seagate OptiCache™ Technology	Yes	Yes	Yes	Yes	No	No	No
Seagate AcuTrac™ Technology	Yes	Yes	Yes	Yes	No	No	No

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.

<sup>2</sup> Seagate ships this drive in both 4K- and 512-byte sectors. SmartAlign technology is included on 4K sector drives. Both drives are functionally and physically equivalent.



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## Exhibit 23



# Storage Solutions Guide



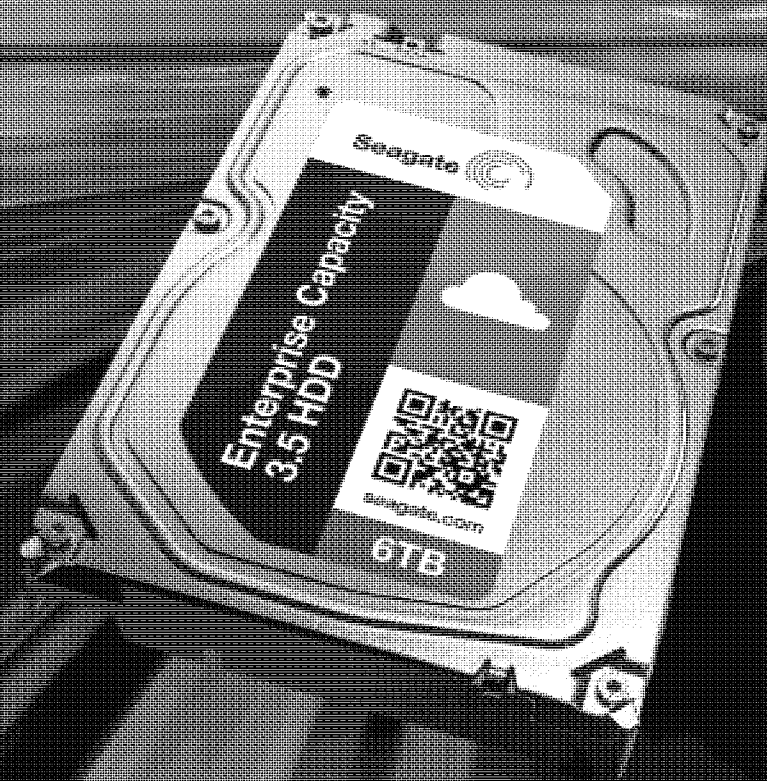
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The Future of Digital  
Video Surveillance Is Here

ENTERPRISE CAPACITY 3.5 HDD

# World's Fastest 6TB Nearline Drive



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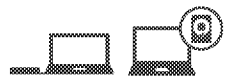
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### RESOURCES AND SERVICES

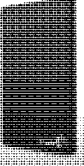
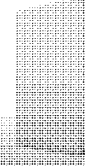
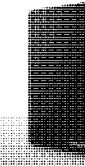

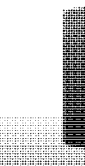

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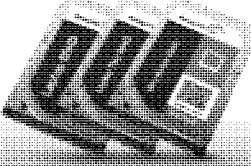








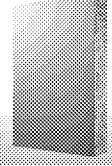
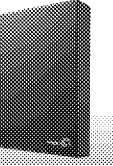




## Choose the best drive for your laptop or mobile device

SEGMENT	External Drives					
PRODUCT						
	Backup Plus Slim Portable	Backup Plus Slim Portable for Mac	Backup Plus Fast Portable	Backup Plus Fast SSD	Expansion Portable	Wireless Plus
PERFECT FOR	Protecting and sharing digital memories		Taking your entire digital library on the go	Editing files right from the drive	Add-on or backup storage	Wireless storage for your tablet
DESCRIPTION	Store and back up the content on your mobile devices and social networks with these portable drives. PC or Mac.		Up to 2× the capacity and performance of other portable drives	High-performance, lightweight portable storage that assists in storing, carrying and sharing content	Expansion drives allow you to instantly add more storage space to your computer and take large files with you.	Take your media library on the go and stream it wirelessly to your iPad, Android tablet and smartphone. PC or Mac.
LEARN MORE	Page 11	Page 11	Page 12	Page 12	Page 13	Page 13

SEGMENT	Internal Drives			
PRODUCT				
	Laptop SSHD, Laptop Thin SSHD and Ultra Mobile SSHD	Laptop Thin HDD	Laptop Ultrathin HDD	Ultra Mobile HDD
PERFECT FOR	Performance	Thin (7mm z-ht.)	Ultrathin (5mm z-ht.)	Ultra-slim tablets (5mm z-ht.)
DESCRIPTION	The ultimate mobile computing experience, with SSD-like performance for all applications and OS environments	Slim computing devices, such as laptops and netbooks	Slim laptops and devices that need light, affordable, high-capacity storage	Robust storage for high-capacity tablets and mobile applications
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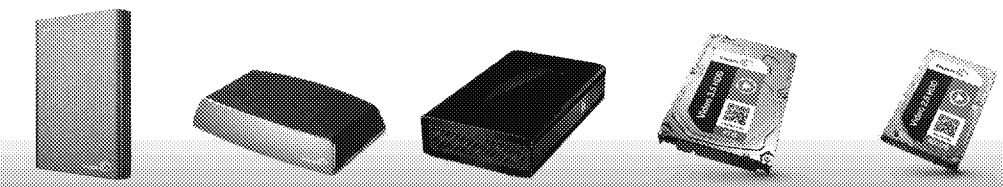
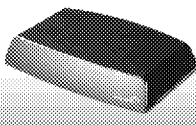
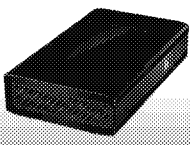


## Choose the best drive for your desktop

SEGMENT	External Drives		
PRODUCT			
	Backup Plus Desktop	Backup Plus Desktop for Mac	Expansion Desktop
PERFECT FOR	Keeping your digital life safe and sound		Add-on or backup storage
DESCRIPTION	These desktop drives provide the simple, one-click way to protect and share files. PC or Mac.		Expansion drives allow you to instantly add more storage space to your computer and take large files with you.
LEARN MORE	Page 17	Page 17	Page 18





SEGMENT	Internal Drives	
PRODUCT		
	Desktop SSHD	Desktop HDD
PERFECT FOR	Performance	Mainstream
DESCRIPTION	Desktop solutions requiring SSD-like performance and massive capacities at an affordable price	Desktop compute where choice in capacity and cache options to provide design flexibility is important
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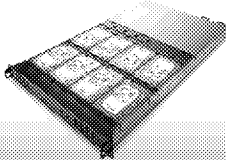
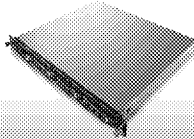




# Choose the best drive for your DVR or video storage

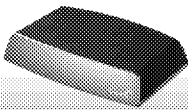
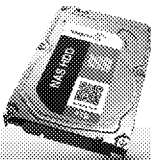


					
PRODUCT	Wireless Plus	Central	DVR Expander	Video 3.5 HDD	Video 2.5 HDD
PERFECT FOR	Wireless storage for your mobile devices	Personal cloud storage	Expanding DVR storage capacity	DVR	DVR
DESCRIPTION	Take your media library on the go and stream it wirelessly to your iPad, Android tablet and smartphone. PC or Mac.	Access your content from anywhere in the world, back up all your computers and stream to your connected devices in the home.	Provides simple, add-on storage that will enable your DVR to store more of your favorite HDTV shows and movies without the hassle of having to delete your favorite content.	DVR systems where reliable, low-power, purpose-built storage is required for video streaming applications. 3-year limited warranty	Video streaming where 24x7 operation, small form factor and low power consumption are needed
LEARN MORE	Page 21	Page 21	Page 22	Page 23	Page 23

# Choose the best drive for your surveillance application









				
PRODUCT	Surveillance HDD	Enterprise Capacity 3.5 HDD	Video 3.5 HDD	Video 2.5 HDD
PERFECT FOR	Surveillance	Centralized surveillance	DVR	DVR
DESCRIPTION	Surveillance systems that require high reliability and streaming capability for centralized storage and surveillance application. 3-year limited warranty	Large centralized or cloud surveillance applications where high levels of video analytics are executed, requiring efficient, enterprise-class reliability	DVR systems or entry-level surveillance applications where reliable, low-power, purpose-built storage is required for video streaming applications	Video streaming or entry-level surveillance systems where 24x7 operation, small form factor and low power consumption are needed
LEARN MORE	Page 25	Page 26	Page 27	Page 27

# Choose the best drive for your network-attached storage

SEGMENT	Business Storage					
PRODUCT						
	Business Storage 8-Bay Rackmount NAS	Business Storage 4-Bay Rackmount NAS	Business Storage 4-Bay NAS	Business Storage Windows Server 4-Bay NAS	Business Storage 2-Bay NAS	Business Storage 1-Bay NAS
PERFECT FOR	Centralized storage, collaboration and backup			Centralized storage, collaboration and backup		
DESCRIPTION	The first 1U rack that fits eight hot-swappable 3.5-inch drives	A complete, high-performance network storage for businesses with up to 100 employees	A complete network storage solution and private cloud for businesses of up to 50 employees.	Makes it easy to expand into a branch office or add local storage to your network by utilizing your existing Windows IT infrastructure.	A complete network storage solution and private cloud for businesses of up to 25 employees.	A complete network storage solution and private cloud for home offices.
LEARN MORE	Page 29	Page 29	Page 30	Page 30	Page 31	Page 31

SEGMENT	Home Network	NAS Internal Drives		
PRODUCT				
	Central	NAS HDD	Terascale™ HDD	Enterprise Capacity 3.5 HDD
PERFECT FOR	Personal cloud storage	Performance	Low Power	High-Density NAS
DESCRIPTION	Access your content from anywhere in the world, back up all your computers and stream to your connected devices in the home.	Small NAS systems needing performance with high capacities	Cost-effective, low-power bulk storage solutions for unstructured data in clouds	Bulk-data applications requiring highest capacity, efficiency and enterprise-class reliability
LEARN MORE	Page 32	Page 33	Page 33	Page 34

# Choose the best drive for your enterprise or cloud storage

SEGMENT	Nearline Storage				Mission-Critical Storage		Solid State Drives	Cloud Storage Platforms
PRODUCT								
	Cloud Data Center Solutions	Enterprise Capacity 2.5 HDD	Enterprise Capacity 3.5 HDD	Terascale™ HDD	Enterprise Performance 10K HDD	Enterprise Performance 15K HDD	1200 SSD	Seagate Kinetic Open Storage platform
PERFECT FOR	Cloud Storage	High Density	Mainstream	Low Power	Mainstream	Performance	Performance	Cloud Data Center
DESCRIPTION	The highest quality of service at the lowest possible total cost of ownership (TCO)	Online reference data demands requiring cost-effective, low-power, enterprise-class drives	Bulk-data applications requiring highest capacity storage, efficiency and enterprise-class reliability	Cost-effective, low-power bulk storage solutions for unstructured data in clouds	Mainstream data requiring high capacity, performance density and reliability	Compute-intensive data requirements demanding the highest performance density and availability	Enterprise storage environments requiring high-performance SSD with data integrity and drive endurance	A software-defined, object-oriented, scale-out approach to data center architecture
LEARN MORE	Page 37	Page 37	Page 38	Page 39	Page 40	Page 41	Page 42	Page 43

# Laptop and Mobile Storage Solutions

Seagate external storage solutions are sleek, dependable and ultra-portable products that let your customers automatically and continuously store digital family photos, protect critical business data, back up multiple computers on a small network, or share and store videos and music.

Seagate laptop and tablet drives address every mobile market need, delivering superior performance, reliability and value. Feature-rich with innovative options, the Seagate mobile lineup also includes self-encryption and FIPS 140-2 validated models.



## Backup Plus Slim Portable

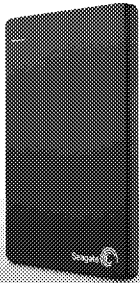
The Backup Plus Slim portable drive is the simple way to protect and share your entire digital life.

### Key Advantages

- Thinnest 2TB portable drive available, up to 42% thinner
- Easy, flexible backups
- Backup photos and videos from smart phones and tablets
- Automatically saves photos from social networks
- Photos and videos can be shared to social networks with a click.
- USB 3.0 for speed and comparability

### Best-Fit Applications

- Store or back up photos, movies, music and documents.
- Mobile device backup
- Download and save content that's posted on your social networks.



CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
2TB	STDR2000100	USB 3.0	● Black	PC, Mac
2TB	STDR2000101	USB 3.0	⦿ Silver	PC, Mac
2TB	STDR2000102	USB 3.0	● Blue	PC, Mac
2TB	STDR2000103	USB 3.0	● Red	PC, Mac
1TB	STDR1000100	USB 3.0	● Black	PC, Mac
1TB	STDR1000101	USB 3.0	⦿ Silver	PC, Mac
1TB	STDR1000102	USB 3.0	● Blue	PC, Mac
1TB	STDR1000103	USB 3.0	● Red	PC, Mac
500GB	STCD500102	USB 3.0	● Black	PC, Mac
500GB	STCD500104	USB 3.0	⦿ Silver	PC, Mac
PRODUCT DIMENSIONS (1TB, 2TB)	4.47-in L x 2.99-in W x 0.48-in D (113.5mm x 76mm x 12.1mm)			
PRODUCT DIMENSIONS (500GB)	4.47-in L x 2.99-in W x 0.38-in D (113.5mm x 76mm x 9.6mm)			
PACKAGE DIMENSIONS	5.71-in L x 4.11-in W x 1.28-in D (145mm x 104.5mm x 32.5mm)			

## Backup Plus Slim Portable for Mac

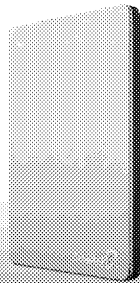
The Backup Plus Slim portable drive for Mac is the simple way to protect and share your entire digital life.

### Key Advantages

- Mac OS and Time-Machine ready out of the box
- Back up photos and videos from smart phones and tablets.
- Automatically saves photos from social networks
- USB 3.0 for speed and comparability

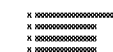
### Best-Fit Applications

- Store or back up photos, movies, music and documents.
- Mobile device backup
- Download and save content that's posted on your social networks.



CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
1TB	STDS1000100	USB 3.0	⦿ Silver/ ● Black	Mac, PC
500GB	STCF500102	USB 3.0	⦿ Silver/ ● Black	Mac, PC
PRODUCT DIMENSIONS (1TB)	4.47-in L x 2.99-in W x 0.48-in D (113.5mm x 76mm x 12.1mm)			
PRODUCT DIMENSIONS (500GB)	4.47-in L x 2.99-in W x 0.38-in D (113.5mm x 76mm x 9.6mm)			
PACKAGE DIMENSIONS	5.71-in L x 4.11-in W x 1.28-in D (145mm x 104.5mm x 32.5mm)			

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
<sup>2</sup> U.S. model numbers shown





# Backup Plus Fast Portable

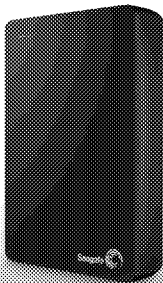
The Backup Plus Fast portable drive has up to 2x the capacity and performance of other portable drives.

## Key Advantages

- Up to 2x faster than other portable drives, up to 220MB/s
- No external power supply required
- Back up content from smart phones, tablets and computers.

## Best-Fit Applications

- Desktop capacity and performance in a portable form factor
- Carry your entire digital library with you on-the-go.
- Portable design, completely bus powered
- Mobile device backup

				
CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
4TB	STDA4000100	USB 3.0	● Black	Mac, PC
PRODUCT DIMENSIONS	4.602-in L x 3.248-in W x 0.880-in D (116.90mm x 82.50mm x 22.35mm)			
PACKAGE DIMENSIONS	5.787-in L x 5.236-in W x 1.850-in D (147mm x 133mm x 47mm)			

# Expansion Portable

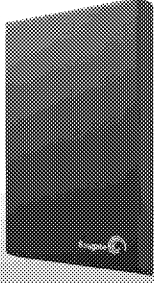
The Expansion portable drive is compact and perfect for taking large files with you on-the-go.

## Key Advantages

- Simple and straightforward setup
- Powered from the USB cable
- Saving files is easy—simply drag and drop.
- USB 3.0 interface allows fast transfer speeds.

## Best-Fit Applications

- Instantly add more storage space to your computer.
- Take large files with you when you travel.

				
CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
2TB	STBX2000401	USB 3.0	● Black	PC
1TB	STBX1000101	USB 3.0	● Black	PC
750GB	STBX750100	USB 3.0	● Black	PC
500GB	STBX500100	USB 3.0	● Black	PC
PRODUCT DIMENSIONS	4.81-in L x 3.19-in W x 0.61-in D (122.3mm x 81.1mm x 15.5mm)			
PACKAGE DIMENSIONS	5.28-in L x 6.69-in W x 1.89-in D (134mm x 170mm x 48mm)			

# Backup Plus Fast SSD

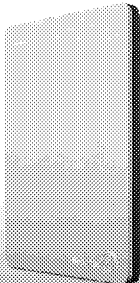
The Backup Plus Fast SSD portable drive lets you amplify genius and accelerate your creativity on the go.

## Key Advantages

- Edit your projects—even HD video—directly from the drive.
- Included USB 3.0 interface to reduce file transfer downtime and increase productivity
- Faster SSD read times and no file indexing required
- Pre-loaded backup software included—part of Seagate Dashboard

## Best-Fit Applications

- Transfer large project files at incredible speeds of up to 430MB/s.
- Keep your files on hand for collaboration.
- Fits easily into your pocket or gear—take it with you on the go.

				
CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
256GB	STCM240100	USB 3.0	● Silver	PC, Mac
PRODUCT DIMENSIONS	4.47-in L x 2.99-in W x 0.38-in D (113.5mm x 76mm x 9.6mm)			
PACKAGE DIMENSIONS	5.71-in L x 4.11-in W x 1.28-in D (145mm x 104.5mm x 32.5mm)			

# Wireless Plus

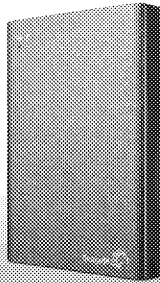
With Wireless Plus mobile device storage, you can enjoy your media and access your files without wires or Web.

## Key Advantages

- Synchronize your Dropbox and Google Drive folders to Wireless Plus
- Take your media library with you on the go
- Share media with up to eight Wi-Fi enabled devices at the same time
- Use anywhere, without an Internet connection
- Up to 10 hours battery life<sup>3</sup>

## Best-Fit Applications

- Store and carry movies and other media on the go.
- Share media with others.
- Works with IOS and Android smartphones and tablets, Amazon Kindle Fire tablets and Windows 8 PCs and tablets

				
CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
2TB	STCV2000100	USB 3.0	● Gray	PC, Mac
1TB	STCK1000101	USB 3.0	● Gray	PC, Mac
500GB	STCV500100	USB 3.0	● Gray	PC, Mac
PRODUCT DIMENSIONS	5.00-in L x 3.50-in W x 0.8-in D (127mm x 89mm x 21mm)			
PACKAGE DIMENSIONS	6.02-in L x 2.0-in W x 7.16-in D (153mm x 51mm x 182mm)			

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
<sup>2</sup> U.S. model numbers shown.  
<sup>3</sup> Exact battery life subject to product model, normal usage conditions and configurations.



# Laptop SSHD, Laptop Thin SSHD and Ultra Mobile SSHD

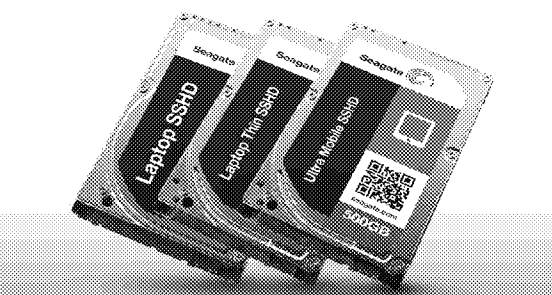
The Seagate line of Laptop and Ultra Mobile SSHD products enable PC users and gamers to enjoy SSD-like performance without sacrificing capacity.

## Key Advantages

- Boots and performs like an SSD<sup>2</sup>
- Performs up to 4x faster than a traditional HDD<sup>2</sup>
- SATA 6Gb/s with NCQ for interface speed
- All-in-one design for simplicity and ease of installation
- No special drivers needed—works in any laptop or PC, any OS and any application
- Backed by a 3-year limited warranty

## Best-Fit Applications

- Laptops, desktops, ultra books and tablets
- High-performance gaming systems
- Small form factor all-in-one PCs



CAPACITY <sup>1</sup>	MODEL	INTERFACE	HEIGHT
1TB	ST1000LM014	SATA 6Gb/s	9.5 mm
500GB	ST500LM000	SATA 6Gb/s	7 mm
500GB	ST500LX009	SATA 6Gb/s	5 mm

CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	MLC FLASH
1TB	STBD1000400	SATA 6Gb/s	8GB

PACKAGE DIMENSIONS	6.25-in L x 4.75-in W x 2.25-in D (159mm x 121mm x 57mm)		
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# Laptop Ultrathin HDD

The Seagate Laptop Ultrathin HDD is one of the thinnest and lightest laptop hard drives—5mm, 3.3 oz. and thinner than a pencil.

## Key Advantages

- Affordable, high-capacity storage gives system builder options when integrating low profile storage into slim laptop and ultrabook solutions
- Compatible with every portable PC with a standard SATA 6Gb/s interface
- Get industry-leading cost-per-GB and cost-per-millimeter
- Seagate Secure™ Self-Encrypting Drive options<sup>3</sup>

## Best-Fit Applications

- Slim laptops or ultrabooks
- Extending high-capacity, affordable storage into other applications and slim devices
- Backup storage



CAPACITY <sup>1</sup>	MODEL	INTERFACE	CACHE
500GB	ST500LT032	SATA 6Gb/s	16MB
500GB	ST500LT033 <sup>3</sup>	SATA 6Gb/s	16MB
320GB	ST320LT030	SATA 6Gb/s	16MB

# Laptop Thin HDD

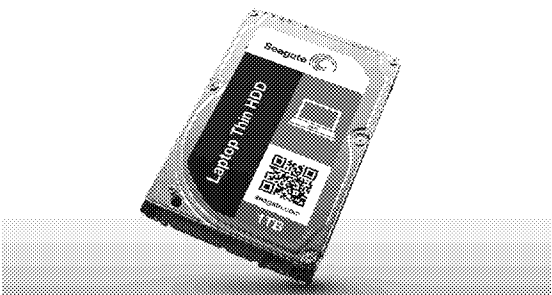
The 7mm, 2.5-inch drive enables slim computing for all types of mobile computing, from laptops to netbooks to smaller desktop PCs.

## Key Advantages

- 7mm z-height form factor enables thin chassis design for all segments of laptop computing.
- Seagate SmartAlign™ technology provides a transition to 4K sectors without the need for software utilities.
- Self-Encrypting Drive<sup>3</sup> options mitigate data breaches, comply with data protection regulations and preserve brand recognition.
- Self-Encrypting Drive options with FIPS 140-2 certification<sup>4</sup> are government-approved for the U.S. and Canadian governments.

## Best-Fit Applications

- Thin entry-level laptop PCs
- Thin high-end netbooks
- Thin ultraportables



CAPACITY <sup>1</sup>	MODEL	INTERFACE	RPM	CACHE
500GB	ST500LT025 <sup>3,5</sup>	SATA 6Gb/s	5900	16MB
500GB	ST500LT015 <sup>4,5</sup>	SATA 6Gb/s	5900	16MB
500GB	ST500LT012	SATA 6Gb/s	5900	16MB
500GB	ST500LM021	SATA 6Gb/s	7200	32MB
320GB	ST320LT012 <sup>5</sup>	SATA 6Gb/s	5900	16MB
320GB	ST320LM010	SATA 6Gb/s	7200	32MB
250GB	ST250LT012 <sup>5</sup>	SATA 6Gb/s	5900	16MB

# Ultra Mobile HDD

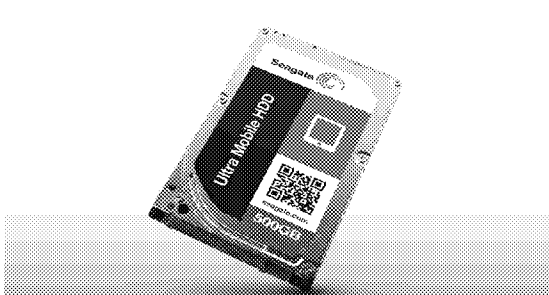
Just 5mm thin and supported by a stainless steel design, the Seagate Ultra Mobile HDD is ready for mobility.

## Key Advantages

- 500GB brings 7× more space to tablet applications at a fraction of the cost.
- Zero-gravity sensors provide extra drop protection.
- Improved shock and tolerance for gyroscopic motion supports even the intense maneuvers of gamers.
- Just 3.3 oz—about the weight of a lightbulb
- Couple with the Seagate Mobile Enablement Kit's Dynamic Data™ Driver for robust and responsive storage with no compromise to system battery life.

## Best-Fit Applications

- Tablets
- Convertible and detachable storage
- Ultra-mobile, ultra-portable storage expansion apps



CAPACITY <sup>1</sup>	MODEL	INTERFACE	CACHE
500GB	ST500LT035	SATA 6Gb/s	16MB

1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
2 Performance may vary depending on user's hardware configuration and operating system. Testing performed on a Laptop SSHD 1TB and a Laptop Thin SSHD 500GB.  
3 Self-Encrypting Drive (SED) are not available in all models or countries. May require BIOS-compatible host or vendor driver support.  
4 See FIPS 140-2 Level 2 Certificate at <http://csrc.nist.gov/groups/STM/cryp/documents/140-1/1401vend.htm>.  
5 SmartAlign technology is not available on this model.  
6 U.S. model numbers shown.

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# Desktop Storage Solutions

Seagate has a distinguished history in consistently delivering innovative technologies, super-sized capacities, low power and blazing-fast performance. Seagate desktop drives offer excellent performance at all levels.

## Backup Plus Desktop

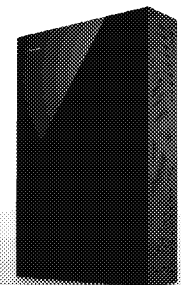
The Backup Plus desktop drive is the simple, one-click way to protect and share your entire digital life.

### Key Advantages

- Easy, flexible backups
- Back up photos and videos from smart phones and tablets.
- Automatically saves photos from social networks
- Photos and videos can be shared to social networks with a click.
- Up to 4TB capacity for a lifetime of memories

### Best-Fit Applications

- Store or back up photos, movies, music and documents.
- Mobile device backup
- Download and save content that's posted on your social networks.



CAPACITY	KIT NUMBER <sup>1</sup>	INTERFACE	COLOR	OS
5TB	STDT5000100	USB 3.0	● Black	PC, Mac
4TB	STDT4000100	USB 3.0	● Black	PC, Mac
3TB	STDT3000101	USB 3.0	● Black	PC, Mac
2TB	STDT2000100	USB 3.0	● Black	PC, Mac
PRODUCT DIMENSIONS	7.063-in L x 4.650-in W x 1.634-in D (179.4mm x 118.10mm x 41.50mm)			
PACKAGE DIMENSIONS	8.346-in L x 5.583-in W x 2.677-in D (212mm x 218mm x 68mm)			

## Backup Plus Desktop for Mac

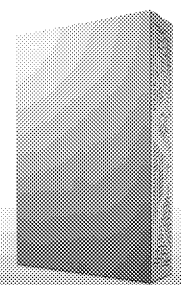
The Backup Plus desktop drive for Mac is the simple, one-click way to protect and share your entire digital life.

### Key Advantages

- Back up photos and videos from smartphones and tablets
- Mac OS and Time Machine ready right out of the box
- Automatically saves photos from social networks
- Share photos and video to social networks with a click.

### Best-Fit Applications

- Mobile device backup
- Back up all your important files.
- Download and save content that's posted on your social networks.
- Share your digital memories to your social networks with a click.



CAPACITY	KIT NUMBER <sup>1</sup>	INTERFACE	COLOR	OS
4TB	STDU4000100	USB 3.0	● Silver	PC, Mac
3TB	STDU3000101	USB 3.0	● Silver	PC, Mac
2TB	STDU2000100	USB 3.0	● Silver	PC, Mac
PRODUCT DIMENSIONS	7.063-in L x 4.650-in W x 1.634-in D (179.4mm x 118.10mm x 41.5mm)			
PACKAGE DIMENSIONS	8.346-in L x 5.583-in W x 2.677-in D (212mm x 218mm x 68mm)			

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
<sup>2</sup> U.S. model number shown.



## Expansion Desktop

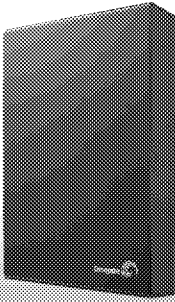
The Expansion desktop drive provides extra storage for your ever-growing collection of files.

### Key Advantages

- Simple and straightforward setup
- No software to install and nothing to configure
- Saving files is easy—simply drag and drop.
- USB 3.0 interface allows fast transfer speeds.

### Best-Fit Applications

- Instantly add more storage space to your computer.
- Improve performance on your computer's internal drive by freeing up space on your internal drive.



CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
5TB	STBV5000100	USB 3.0	● Black	PC
4TB	STBV4000100	USB 3.0	● Black	PC
3TB	STBV3000100	USB 3.0	● Black	PC
2TB	STBV2000100	USB 3.0	● Black	PC
1TB	STBV1000100	USB 3.0	● Black	PC
PRODUCT DIMENSIONS	7.07-in L x 4.65-in W x 1.48-in D (179.5mm x 118mm x 37.5mm)			
PACKAGE DIMENSIONS	9.09-in L x 7.95-in W x 2.83-in D (231mm x 202mm x 72mm)			

## Desktop SSHD

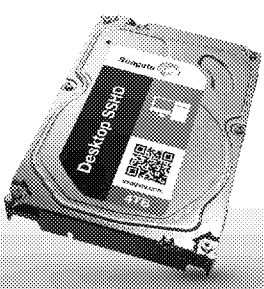
Seagate Desktop SSHD (solid state hybrid drive) delivers SSD-like performance and massive capacities at an affordable price.

### Key Advantages

- First SSHD in a 3.5-inch form factor
- SATA 6Gb/s with NCQ for interface speed
- Performs up to 3x faster than a traditional HDD<sup>3</sup>
- All-in-one design for ease of installation
- Installs and operates like a standard hard drive
- Massive 1TB, 2TB or 4TB capacities combined with SSD-like performance<sup>3</sup>

### Best-Fit Applications

- Desktop PCs
- Workstations
- High-performance direct-attached storage (DAS) devices



CAPACITY <sup>1</sup>	MODEL	INTERFACE	CACHE
4TB	ST4000DX001	SATA 6Gb/s	64MB
2TB	ST2000DX001	SATA 6Gb/s	64MB
1TB	ST1000DX001	SATA 6Gb/s	64MB

CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	MLC FLASH
4TB	STCL4000400	SATA 6Gb/s	8GB
2TB	STCL2000400	SATA 6Gb/s	8GB
PACKAGE DIMENSIONS	5.88-in L x 7.75-in W x 2.88-in D (149.35mm x 196.85mm x 73.15mm)		

## Desktop HDD

Seagate Desktop HDDs give you the Power of One with 1TB-per-disk technology and one drive platform for every desktop capacity and application.

### Key Advantages

- Up to 4TB capacity
- AcuTrac™ technology deliver dependable overall performance.
- Free Seagate DiscWizard™ software

### Best-Fit Applications

- Desktop systems
- All-in-one PCs
- Entry-level home servers



CAPACITY <sup>1</sup>	MODEL	INTERFACE	CACHE
4TB	ST4000DM000	SATA 6Gb/s NCQ	64MB
3TB	ST3000DM001	SATA 6Gb/s NCQ	64MB
2TB	ST2000DM001	SATA 6Gb/s NCQ	64MB
1TB	ST1000DM003	SATA 6Gb/s NCQ	64MB
500GB	ST500DM002	SATA 6Gb/s NCQ	16MB
320GB	ST320DM000	SATA 6Gb/s NCQ	16MB
250GB	ST250DM000	SATA 6Gb/s NCQ	16MB

CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	CACHE
4TB	STBD4000400	SATA 6Gb/s	64MB
3TB	STBD3000100	SATA 6Gb/s	64MB
2TB	STBD2000101	SATA 6Gb/s	64MB
1TB	ST310005N1A1AS-RK	SATA 6Gb/s	64MB
PACKAGE DIMENSIONS	5.88-in L x 7.75-in W x 2.88-in D (149.35mm x 196.85mm x 73.15mm)		

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one billion bytes when referring to drive capacity.  
<sup>2</sup> U.S. model numbers shown.  
<sup>3</sup> Performance may vary depending on user's hardware configuration and operating system.





# DVR and Video Storage Solutions

Storage solutions for digital video recorders (DVR) and video applications

Seagate continues its recognized leadership and reliability in the DVR space to deliver first-class video-optimized products. From media centers and set-top boxes to DVR storage and expansion, Seagate has a solution, no matter what your video need.

## Wireless Plus

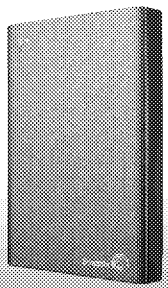
With Wireless Plus mobile device storage, you can enjoy your media and access your files without wires or Web.

### Key Advantages

- Synchronize your Dropbox and Google Drive folders to Wireless Plus
- Take your media library with you on the go
- Share media with up to eight Wi-Fi enabled devices at the same time
- Use anywhere, without an Internet connection
- Up to 10 hours battery life<sup>3</sup>

### Best-Fit Applications

- Store and carry movies and other media on the go.
- Share media with others.
- Works with IOS and Android smartphones and tablets, Amazon Kindle Fire tablets and Windows 8 PCs and tablets



CAPACITY	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
2TB	STCV2000100	USB 3.0	Gray	PC, Mac
1TB	STCK1000101	USB 3.0	Gray	PC, Mac
500GB	STCV500100	USB 3.0	Gray	PC, Mac
PRODUCT DIMENSIONS	5.00-in L x 3.50-in W x 0.8-in D (127mm x 89mm x 21mm)			
PACKAGE DIMENSIONS	6.02-in L x 2.0-in W x 7.16-in D (153mm x 51mm x 182mm)			

## Central

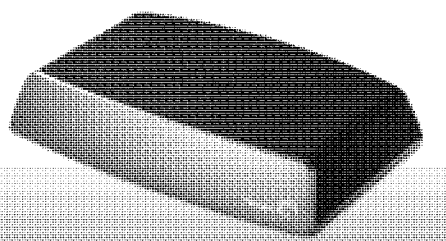
The Central shared network storage system allows you to create secure in-home cloud storage for multiple computers in the home.

### Key Advantages

- Automatically back up multiple PC and Mac computers
- Wirelessly stream your centralized media library to gaming consoles, media players and smart TVs
- Access content on-the-go with a Web browser or the free app for tablets and smartphones

### Best-Fit Applications

- Consolidate content on one easily accessible device
- Back up multiple PC and Mac computers
- Enjoy a centralized media library on smart TVs, game consoles and media players
- Access your content on-the-go with laptops and mobile devices
- Archive your Facebook photos and videos



CAPACITY	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
4TB	STCG4000100	SATA/GigE	Black	PC, Mac
3TB	STCG3000100	SATA/GigE	Black	PC, Mac
2TB	STCG2000100	SATA/GigE	Black	PC, Mac
PRODUCT DIMENSIONS	5.7-in L x 8.5-in W x 1.7-in D (145mm x 216mm x 42mm)			
PACKAGE DIMENSIONS	3.15-in L x 10.3-in W x 9.25-in D (80mm x 261mm x 235mm)			

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one billion bytes when referring to drive capacity.  
<sup>2</sup> U.S. model numbers shown.  
<sup>3</sup> Exact battery life subject to product model, normal usage conditions and configurations.

## DVR Expander

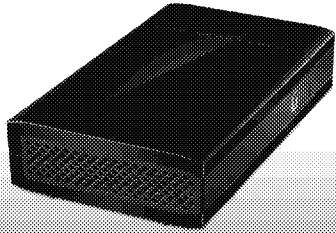
This simple add-on storage for your DVR lets you save more of your favorite HDTV shows and movies.

### Key Advantages

- Instantly add more recording hours for your favorite shows.
- Capture extended-length movies, sporting events, and archive seasons of your favorite TV shows.
- Can stand vertically or lie flat
- Includes both USB 2.0 and eSATA connections

### Best-Fit Applications

- Expand your DVR storage capacity.
- Build your library without having to delete older shows.
- Low-profile design fits neatly into your home entertainment environment



CAPACITY <sup>1</sup>	KIT NUMBER	INTERFACE	COLOR	OS
2TB	STAP2000102	USB 2.0/eSATA	● Black	PC, Mac
1TB	STAP1000103	USB 2.0/eSATA	● Black	PC, Mac
PRODUCT DIMENSIONS	8-in L x 4.73-in W x 1.81-in D (203mm x 120mm x 46mm)			
PACKAGE DIMENSIONS	8.67-in L x 3.07-in W x 9.33-in D (222mm x 78mm x 237mm)			

## Video 3.5 HDD

Seagate Video 3.5 HDDs deliver unprecedented levels of acoustic, power and vibration performance with room for hundreds of your favorite movies.

### Key Advantages

- Quiet drive operation to enhance customer viewing and listening experiences
- 75°C, 24-hour operation capable
- Operational power consumption as low as 3.4W
- 2.0A spin-up current limited

### Best-Fit Applications

- Consumer digital video recorders
- Media servers and centers
- Home theater PCs and servers
- Cable, satellite and IPTV set-top boxes



CAPACITY <sup>1</sup>	MODEL	INTERFACE	CACHE
4TB	ST4000VM000	SATA 6Gb/s	64MB
3TB	ST3000VM002	SATA 6Gb/s	64MB
2TB	ST2000VM003	SATA 6Gb/s	64MB
1TB	ST1000VM002	SATA 6Gb/s	64MB
500GB	ST3500312CS	SATA 3Gb/s	8MB
320GB	ST3320311CS	SATA 3Gb/s	8MB
250GB	ST3250312CS	SATA 3Gb/s	8MB

## Video 2.5 HDD


Seagate Video 2.5 HDDs let you stream, record and play back your video content with unparalleled reliability and performance.

### Key Advantages

- Virtually silent streaming performance as low as 19dB
- Built for 24x7 operation and low power consumption
- Small, 2.5-inch form factor allows system cost reduction and operational power savings
- Fanless design allows flexibility in a sleek system design.
- 0.55% AFR supports longevity in demanding consumer electronic environments.

### Best-Fit Applications

- DVR and media center applications
- Home theater PCs
- Karaoke and audio jukeboxes
- Cable, satellite and IPTV set-top boxes
- In-camera or surveillance systems



CAPACITY <sup>1</sup>	MODEL	INTERFACE	CACHE
500GB	ST500VT000	SATA 3Gb/s	16MB
320GB	ST320VT000	SATA 3Gb/s	16MB
250GB	ST250VT000	SATA 3Gb/s	16MB

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
<sup>2</sup> U.S. model numbers shown



# Surveillance Storage Solutions

A pioneer in the surveillance space, Seagate leads the market with purpose-built surveillance storage. From entry-level surveillance DVRs to the rapidly growing network video recorder (NVR) and centralized surveillance storage, Seagate has a solution to meet your needs.

## Surveillance HDD

The Seagate Surveillance HDD (formerly SV35 Series) is purpose-built surveillance storage that can keep your systems in the field longer and reduce post-deployment support.

### Key Advantages

- Seventh-generation surveillance-optimized drive improves video streaming and data integrity in surveillance applications
- Support for up to 32 cameras per drive and 16 drives in a system
- Reliably performs in multi-drive systems with RAID support from RV sensors

### Best-Fit Applications

- Network Video Recorder (NVR)
- Embedded SDVR
- Hybrid SDVR
- Surveillance DVR



CAPACITY <sup>1</sup>	MODEL	INTERFACE	CACHE
4TB	ST4000VX000	SATA 6Gb/s	64MB
3TB	ST3000VX002	SATA 6Gb/s	64MB
3TB	ST3000VX000	SATA 6Gb/s	64MB
2TB	ST2000VX000	SATA 6Gb/s	64MB
1TB	ST1000VX000	SATA 6Gb/s	64MB



<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.



## Enterprise Capacity 3.5 HDD

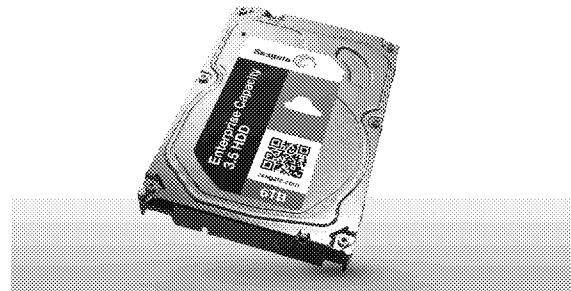
The Seagate Enterprise Capacity 3.5 HDDs help centralized or cloud surveillance systems and systems leveraging high levels of video analytics.

### Key Advantages

- Highest-capacity enterprise drive for maximum density server and storage solutions
- SAS and SATA interfaces with 24x7 reliability
- Predictable performance even in the most rugged multi-drive environments
- Improved power and cooling efficiencies with low power consumption and on-demand PowerChoice™ technology
- Protect your data and ease data disposal costs and management with the Self-Encrypting Drive (SED) and FIPS 140-2 certified SED<sup>2,3</sup>

### Best-Fit Applications

- Massive scale-out surveillance environments
- High-density data centers
- Mainstream enterprise external storage (SAN, NAS, DAS)
- Cloud bulk data storage
- Enterprise backup and restore
- Centralized surveillance



CAPACITY	MODEL NUMBER	SECTOR SIZE	INTERFACE	CACHE
6TB	ST6000NM0004	4KN	SATA 6Gb/s	128MB
6TB	ST6000NM0024	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0084 <sup>2,3</sup>	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0014	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0034	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0104 <sup>2,3</sup>	5xxE	12Gb/s SAS	128MB
6TB	ST5000NM0024	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0024	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0034	5xxE	12Gb/s SAS	128MB
4TB	ST4000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
4TB	ST4000NM0033	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0073 <sup>2,3</sup>	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0023	5xxN	6Gb/s SAS	128MB
4TB	ST4000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
4TB	ST4000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0033	5xxN	SATA 6Gb/s	128MB
3TB	ST3000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
3TB	ST3000NM0023	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0024	5xxE	SATA 6Gb/s	128MB
2TB	ST2000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
2TB	ST2000NM0034	5xxE	12Gb/s SAS	128MB
2TB	ST2000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
2TB	ST2000NM0033	5xxN	SATA 6Gb/s	128MB
2TB	ST2000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
2TB	ST2000NM0023	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0033	5xxN	SATA 6Gb/s	128MB
1TB	ST1000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
1TB	ST1000NM0023	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB

## Video 3.5 HDD

Seagate Video 3.5 HDDs deliver unprecedented levels of acoustic, power and vibration performance with room for months of surveillance footage.

### Key Advantages

- Quiet drive operation to enhance customer viewing and listening experiences
- 75°C, 24-hour operation capable
- Operational power consumption as low as 3.4W
- 2.0A spin-up current limited

### Best-Fit Applications

- Surveillance digital video recorders
- Media servers and centers



CAPACITY	MODEL	INTERFACE	CACHE
4TB	ST4000VM000	SATA 6Gb/s	64MB
3TB	ST3000VM002	SATA 6Gb/s	64MB
2TB	ST2000VM003	SATA 6Gb/s	64MB
1TB	ST1000VM002	SATA 6Gb/s	64MB
500GB	ST3500312CS	SATA 3Gb/s	8MB
320GB	ST3320311CS	SATA 3Gb/s	8MB
250GB	ST3250312CS	SATA 3Gb/s	8MB

## Video 2.5 HDD

Seagate Video 2.5 HDDs let you stream, record and play back your video content with unparalleled reliability and performance.

### Key Advantages

- Virtually silent streaming performance as low as 19dB
- Built for 24x7 operation and low power consumption
- Small, 2.5-inch form factor allows system cost reduction and operational power savings
- Fanless design allows flexibility in a sleek system design.
- 0.55% AFR supports longevity in demanding consumer electronic environments.

### Best-Fit Applications

- Entry-level surveillance DVR
- Home surveillance PCs



CAPACITY	MODEL	INTERFACE	CACHE
500GB	ST500VT000	SATA 3Gb/s	16MB
320GB	ST320VT000	SATA 3Gb/s	16MB
250GB	ST250VT000	SATA 3Gb/s	16MB





# Network-Attached Storage Solutions

Seagate network-attached storage (NAS) solutions meet the ever-changing needs of business. Exploding volumes of business data. Increasingly decentralized operations. An expanding mobile workforce. Whatever your challenge, the Seagate family of NAS products has the flexible capacity, unparalleled performance and best-in-class security you need to take your business to the next level.

## Business Storage 8-Bay Rackmount NAS

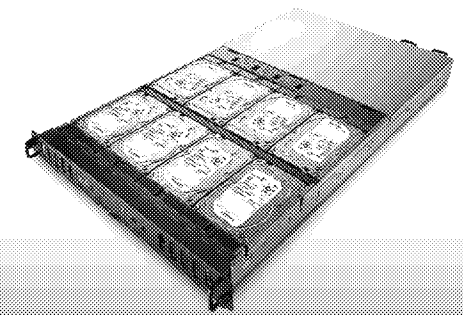
A complete network storage solution with innovative 8-bay design in a 1U form factor that is perfect for growing businesses

### Key Advantages

- A 2.3GHz dual-core Intel processor delivers file transfer performance of up to 200MB/s
- Wuala™ cloud service and apps for secure collaboration and anywhere access
- Centralized backup for PCs, plus Time Machine support for Mac computers
- Support for iSCSI enables maximum performance and compatibility for virtualized environments

### Best-Fit Applications

- Store business-critical files centrally and securely
- Back up your organization's PC and Mac computers
- Access and manage files remotely using Internet-connected computers and devices
- Back up files to the cloud



CAPACITY	KIT NUMBER	INTERFACE	COLOR	OS
32TB	STDP32000100	Gigabit Ethernet	● Black	PC, Mac
24TB	STDP24000100	Gigabit Ethernet	● Black	PC, Mac
18TB	STDP18000100	Gigabit Ethernet	● Black	PC, Mac
12TB	STDP12000100	Gigabit Ethernet	● Black	PC, Mac
8TB	STDP8000100	Gigabit Ethernet	● Black	PC, Mac
PRODUCT DIMENSIONS	30.394-in L x 1.713-in W x 18.78-in D (772mm x 43.5mm x 477mm)			
PACKAGE DIMENSIONS	35.354-in L x 23.465-in W x 8.661-in D (898mm x 596mm x 220mm)			

## Business Storage 4-Bay Rackmount NAS

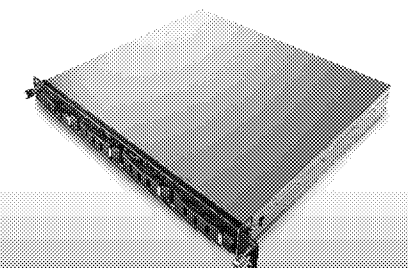
Centralize your storage and backups with a complete network storage solution that saves valuable floor space for small businesses.

### Key Advantages

- Centralized storage and backup for PCs and Macs, plus secure Wuala cloud off-site backup service
- A dual-core Intel Atom processor and new, performance-optimized Seagate NAS OS deliver file transfer speeds up to 200MB/s
- Anywhere access to your files
- Hot-swappable drives and dual Gigabit Ethernet ports help increase up-time

### Best-Fit Applications

- Store business-critical files centrally and securely
- Back up your organization's PC and Mac computers
- Access and manage files remotely using Internet-connected computers and devices
- Back up files to the cloud



CAPACITY	KIT NUMBER	INTERFACE	COLOR	OS
16TB	STDN16000100	Gigabit Ethernet	● Black	PC, Mac
12TB	STDN12000100	Gigabit Ethernet	● Black	PC, Mac
8TB	STDN8000100	Gigabit Ethernet	● Black	PC, Mac
4TB	STDN4000100	Gigabit Ethernet	● Black	PC, Mac
....	STDN100	Gigabit Ethernet	● Black	PC, Mac
PRODUCT DIMENSIONS	16.929-in L x 15-in W x 1.713-in D (430mm x 381mm x 42.5mm)			
PACKAGE DIMENSIONS	22.44-in L x 19.567-in W x 6.496-in D (570mm x 497mm x 164mm)			

1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
2 U.S. model numbers shown



## Business Storage 4-Bay NAS


A complete, small-business-specific network storage solution designed to provide optimum uptime and data integrity for up to 50 workstations

### Key Advantages

- Easy 10-minute setup
- Upload and download files with free apps for iPhone, iPad and Android devices
- Full-system, automatic backup for PCs, plus Time Machine support for Mac computers
- Customize performance and data redundancy with RAID 0, 1, 5 and 10 configuration options

### Best-Fit Applications

- Make automatic, continuous backups
- Store files in a secure, central location
- Access and manage files remotely using Internet-connected devices
- Create cost-effective, private cloud storage
- Encrypt individual files to entire volumes of data



CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
16TB	STBP16000100	Gigabit Ethernet	● Black	PC, Mac
12TB	STBP12000100	Gigabit Ethernet	● Black	PC, Mac
8TB	STBP8000100	Gigabit Ethernet	● Black	PC, Mac
4TB	STBP4000100	Gigabit Ethernet	● Black	PC, Mac
---	STBP100	Gigabit Ethernet	● Black	PC, Mac
PRODUCT DIMENSIONS	6.3-in W x 8.2-in H x 10.2-in D (161.00mm x 208.00mm x 258.50mm)			
PACKAGE DIMENSIONS	9.4-in W x 14.9-in H x 9.4-in D (240.00mm x 379.00mm x 243.00mm)			

## Business Storage 2-Bay NAS

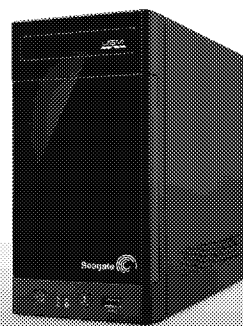
Create a private cloud to help protect your business-critical data and centralize files in a single location you can access from anywhere

### Key Advantages

- Easy 10-minute setup
- Upload and download files with free apps for iPhone, iPad and Android devices
- Full-system, automatic backup for PCs, plus Time Machine support for Mac computers
- Customize performance and data redundancy with RAID 0 and 1 configuration options

### Best-Fit Applications

- Make automatic, continuous backups of multiple PC and Mac computers
- Store files in a secure, central location
- Access and manage files remotely using Internet-connected computers, tablets and smartphones
- Create cost-effective, private cloud storage



CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
8TB	STBN8000100	Gigabit Ethernet	● Black	PC, Mac
6TB	STBN6000100	Gigabit Ethernet	● Black	PC, Mac
4TB	STBN4000100	Gigabit Ethernet	● Black	PC, Mac
---	STBN100	Gigabit Ethernet	● Black	PC, Mac
PRODUCT DIMENSIONS	4.1-in W x 8.0-in H x 8.9-in D (104.50mm x 204.00mm x 227.00mm)			
PACKAGE DIMENSIONS	6.2-in W x 10.9-in H x 12.5-in D (157.00mm x 277.00mm x 317.00mm)			

## Business Storage Windows Server 4-Bay NAS


Expand into a branch office or add local storage to your network by utilizing your existing Windows IT infrastructure.

### Key Advantages

- Complete integration with your existing Windows IT infrastructure
- Native support for Active Directory lets you simplify setup and manage users through an existing directory.
- Delivers network file transfer performance up to 200MB/s
- Connect external drives to USB 3.0 ports or USM slot.

### Best-Fit Applications

- Branch offices with up to 50 employees
- Growing businesses utilizing Windows IT infrastructure
- Centralize management and integration with other Windows Servers



CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
16TB	STDM16000100	Gigabit Ethernet	● Black	PC, Mac
12TB	STDM12000100	Gigabit Ethernet	● Black	PC, Mac
8TB	STDM8000100	Gigabit Ethernet	● Black	PC, Mac
4TB	STDM4000100	Gigabit Ethernet	● Black	PC, Mac
PRODUCT DIMENSIONS	9.921-in L x 6.299-in W x 7.874-in D (252mm x 160mm x 200mm)			
PACKAGE DIMENSIONS	15.197-in L x 9.409-in W x 9.488-in D (386mm x 239mm x 241mm)			

## Business Storage 1-Bay NAS

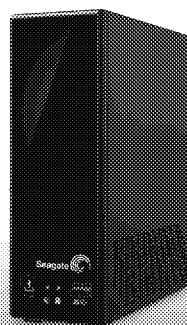
Create a private cloud with Seagate Business Storage 1-Bay NAS. It helps protect your all-important data and centralizes your files in a single location you can access from anywhere.

### Key Advantages

- Easy 10-minute setup
- Upload and download files with free apps for iPhone, iPad and Android devices
- Full-system, automatic backup for PCs, plus Time Machine support for Mac computers
- Stream your media library to networked computers, Internet TVs, game consoles and more

### Best-Fit Applications

- Make automatic, continuous backups of multiple PC and Mac computers
- Store files in a secure, central location
- Access and manage files remotely using Internet-connected computers, tablets and smartphones
- Create cost-effective, private cloud storage



CAPACITY <sup>1</sup>	KIT NUMBER <sup>2</sup>	INTERFACE	COLOR	OS
4TB	STBM4000100	Gigabit Ethernet	● Black	PC, Mac
3TB	STBM3000100	Gigabit Ethernet	● Black	PC, Mac
2TB	STBM2000100	Gigabit Ethernet	● Black	PC, Mac
PRODUCT DIMENSIONS	2.4-in W x 6.9-in H x 5.8-in D (61mm x 176mm x 148mm)			
PACKAGE DIMENSIONS	3.7-in W x 9.3-in H x 9.0-in D (93mm x 236mm x 229mm)			





# Central

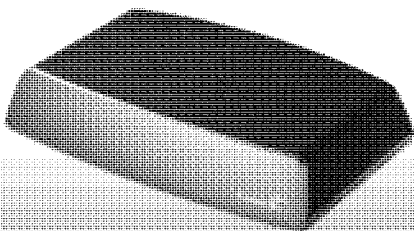
The Central shared network storage system allows you to create secure in-home cloud storage for multiple computers in the home.

## Key Advantages

- Automatically back up multiple PC and Mac computers
- Wirelessly stream your centralized media library to gaming consoles, media players and smart TVs
- Access content on-the-go with a Web browser or the free app for tablets and smartphones

## Best-Fit Applications

- Consolidate content on one easily accessible device
- Back up multiple PC and Mac computers
- Enjoy a centralized media library on smart TVs, game consoles and media players
- Access your content on-the-go with laptops and mobile devices
- Archive your Facebook photos and videos



CAPACITY	MODEL	INTERFACE	COLOR	OS
4TB	STCG4000100	SATA/GigE	Black	PC, Mac
3TB	STCG3000100	SATA/GigE	Black	PC, Mac
2TB	STCG2000100	SATA/GigE	Black	PC, Mac
PRODUCT DIMENSIONS	5.7-in L x 8.5-in W x 1.7-in D (145mm x 216mm x 42mm)			
PACKAGE DIMENSIONS	3.15-in L x 10.3-in W x 9.25-in D (80mm x 261mm x 235mm)			

# NAS HDD

The Seagate NAS HDD fine-tunes the needs of 1- to 5-bay NAS systems to provide industry-leading performance and highest-capacity storage.

## Key Advantages

- NASWorks™ technology supports custom error recovery controls, power management and vibration tolerance.
- NAS error recovery controls help to ensure drives are not dropped from the NAS and sent into a RAID rebuild.
- Improved vibration tolerance and emission in multi-drive systems with dual-plane balance
- Advanced power management supports multiple power profiles for low-power, 24x7 performance.

## Best-Fit Applications

- Home servers or desktop NAS solutions
- Small-business file sharing
- Backup servers



CAPACITY	MODEL	INTERFACE	CACHE
4TB	ST4000VN000	SATA 6Gb/s	64MB
3TB	ST3000VN000	SATA 6Gb/s	64MB
2TB	ST2000VN000	SATA 6Gb/s	64MB

# Terascale™ HDD

The Seagate Terascale HDD is designed for large Web-scale data centers where low-cost, low-power and high-capacity storage is critical.

## Key Advantages

- Affordable storage for 24x7 multi-drive replicated environments
- High vibration tolerance for reliable enterprise-class performance
- Low power and cooling costs with the lowest 3.5-inch enterprise drive operating power
- Advanced format logical block management for industry-leading data integrity

## Best-Fit Applications

- Web-scale computing
- Cloud storage servers and arrays
- Cloud backup storage
- Direct-attached external storage (DAS)
- Network-attached storage (NAS)



CAPACITY	5x EMULATION	MODEL	INTERFACE	CACHE
4TB		ST4000NC000 <sup>1</sup>	SATA 6Gb/s	64MB
4TB		ST4000NC001	SATA 6Gb/s	64MB
3TB		ST3000NC002	SATA 6Gb/s	64MB
3TB		ST3000NC000 <sup>1</sup>	SATA 6Gb/s	64MB
2TB		ST2000NC001	SATA 6Gb/s	64MB
2TB		ST2000NC000 <sup>1</sup>	SATA 6Gb/s	64MB
1TB		ST1000NC001	SATA 6Gb/s	64MB
1TB		ST1000NC000 <sup>1</sup>	SATA 6Gb/s	64MB

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
<sup>2</sup> U.S. model numbers shown.  
<sup>3</sup> Seagate Instant Secure Erase Model.





# Enterprise Capacity 3.5 HDD

The Seagate Enterprise Capacity 3.5 HDDs help both private and public data centers meet the demanding growth of unstructured data in high-density NAS environments.

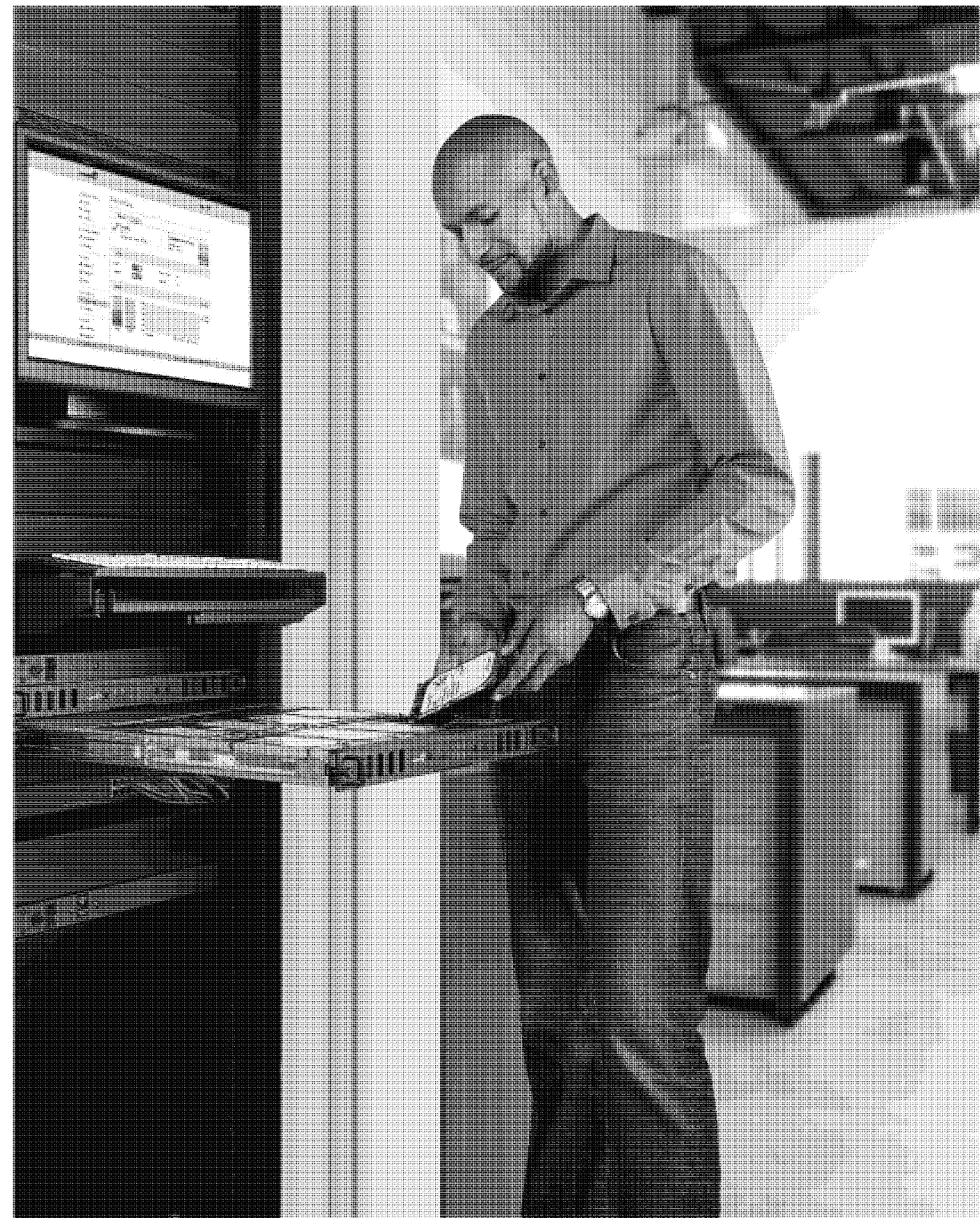
## Key Advantages

- Highest-capacity enterprise drive for maximum density server and storage solutions
- SAS and SATA interfaces with 24x7 reliability
- Predictable 7200-RPM performance even in the most rugged multi-drive environments
- Improved power and cooling efficiencies with low power consumption and on-demand PowerChoice™ technology
- Protect your data and ease data disposal costs and management with the Self-Encrypting Drive (SED) and FIPS 140-2 certified SED<sup>2,3</sup>

## Best-Fit Applications

- Massive scale-out NAS environments
- High-density NAS solutions
- Mainstream enterprise external storage (SAN, NAS, DAS)
- Cloud bulk data storage
- Enterprise backup and restore—D2D, virtual tape

CAPACITY	MODEL NUMBER	SECTOR SIZE	INTERFACE	CACHE
6TB	ST6000NM0004	4KN	SATA 6Gb/s	128MB
6TB	ST6000NM0024	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0084 <sup>2,3</sup>	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0014	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0034	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0104 <sup>2,3</sup>	5xxE	12Gb/s SAS	128MB
5TB	ST5000NM0024	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0024	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0034	5xxE	12Gb/s SAS	128MB
4TB	ST4000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
4TB	ST4000NM0033	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0073 <sup>2,3</sup>	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0023	5xxN	6Gb/s SAS	128MB
4TB	ST4000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
4TB	ST4000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0033	5xxN	SATA 6Gb/s	128MB
3TB	ST3000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
3TB	ST3000NM0023	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0024	5xxE	SATA 6Gb/s	128MB
2TB	ST2000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
2TB	ST2000NM0034	5xxE	12Gb/s SAS	128MB
2TB	ST2000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
2TB	ST2000NM0033	5xxN	SATA 6Gb/s	128MB
2TB	ST2000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
2TB	ST2000NM0023	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0033	5xxN	SATA 6Gb/s	128MB
1TB	ST1000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
1TB	ST1000NM0023	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB



1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
2 Self-Encrypting Drive (SED) and FIPS 140-2 Validated drives are not available in all models or countries.  
3 May require TCG compliance tool or controller support.  
3 FIPS 140-2 in review. See FIPS 140-2 Level 2 Certificate at <http://www.nist.gov/groups/STM/cryptdev/documents/140-1/1401vrs2011.htm#16.35>





# Enterprise and Cloud Storage Solutions

With more than 30 years of experience and the broadest storage product portfolio available, Seagate consistently designs, builds and supports industry-leading enterprise hard drives, solid state drives and hybrid drives. Seagate has the global presence, processes and resources to support businesses of all sizes with the highest-quality enterprise storage products.

## Cloud Data Center Solutions

As the need for data storage continues to explode, enterprise and cloud architects and data center managers are challenged to deliver the highest quality of service at the lowest possible total cost of ownership (TCO). Seagate can help.

### Choose the Right Enterprise Drives for Your Data Center Applications

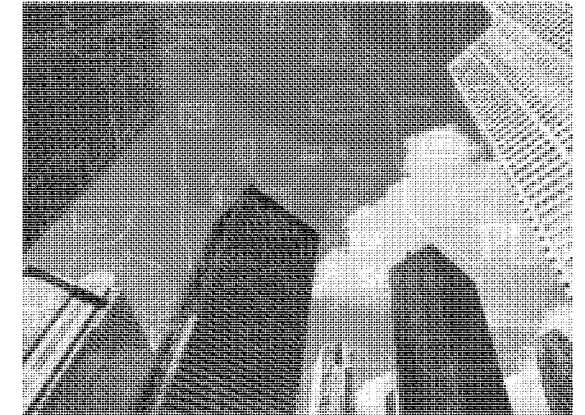
Navigating storage technology tradeoffs from capacity to performance, deploy-ability to manageability, and predictability to reliability can be complex. Seagate enables you to choose the storage technology that best meets your needs today and as your business grows.

### Data Center Management and Operational Efficiency

The costs of designing, deploying, operating and supporting data centers continue to rise. Seagate services, features and platforms enable you to increase operational efficiency by driving unneeded cost out of the data center.

### Seagate Kinetic Open Storage Platform

The Seagate Kinetic Open Storage platform is the first device-based storage platform enabling independent software vendors (ISV), cloud service providers (CSP) and enterprise customers to optimize scale-out file and object-based storage, delivering lower TCO.



## Enterprise Capacity 2.5 HDD

The Seagate Enterprise Capacity 2.5 HDD drive is the only 2.5-inch enterprise-class hard drive delivering both 1TB capacities and enterprise reliability.

### Key Advantages

- Maximizes data center footprint
- Energy-efficient storage at under 3.9W (idle)
- Highest nearline reliability with an MTBF of 1.4M hours
- Self-Encrypting Drive (SED)<sup>2</sup> and FIPS 140-2 certified SED<sup>3</sup> cut IT drive retirement costs and protect data.
- FIPS options meet government encryption compliance standards.

### Best-Fit Applications

- Storage-hungry business applications
- Storage area networks and network-attached storage
- Maximum-capacity servers and blade servers
- Rich media content storage
- Enterprise backup and restore—D2D, virtual tape
- Cloud computing

1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
 2 Self-Encrypting Drive (SED) and FIPS 140-2 Validated drives are not available in all models or countries. May require TCO-compliant host or controller support.  
 3 See FIPS 140-2 Level 2 Certificate at <http://csrc.nist.gov/groups/STM/corp/documents/140-1/1401vsg2011.html>.  
 4 FIPS 140-2 in review. See FIPS 140-2 Level 2 Certificate at <http://csrc.nist.gov/groups/STM/corp/documents/140-1/1401vsg2011.html#1R35>.



CAPACITY	5-yr. NATIVE MODEL	INTERFACE	CACHE
1TB	ST91000640NS	SATA 6Gb/s	64MB
1TB	ST91000641NS <sup>2</sup>	SATA 6Gb/s	64MB
1TB	ST91000642NS <sup>2,4</sup>	SATA 6Gb/s	64MB
1TB	ST91000640SS	6Gb/s SAS	64MB
1TB	ST91000641SS <sup>2</sup>	6Gb/s SAS	64MB
1TB	ST91000642SS <sup>2,4</sup>	6Gb/s SAS	64MB
500GB	ST9500620NS	SATA 6Gb/s	64MB
500GB	ST9500620SS	6Gb/s SAS	64MB
250GB	ST9250610NS	SATA 6Gb/s	64MB



# Enterprise Capacity 3.5 HDD

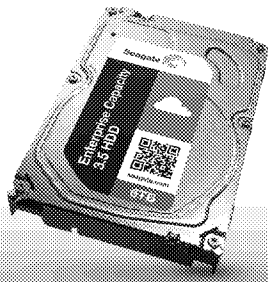
The Seagate Enterprise Capacity 3.5 HDDs help both private and public data centers meet the demanding growth of unstructured data.

## Key Advantages

- Highest-capacity enterprise drive for maximum density server and storage solutions
- SAS and SATA interfaces with 24x7 reliability
- Predictable 7200-RPM performance even in the most rugged multi-drive environments
- Improved power and cooling efficiencies with low power consumption and on-demand PowerChoice™ technology
- Protect your data and ease data disposal costs and management with the Self-Encrypting Drive (SED) and FIPS 140-2 certified SED<sup>2,3</sup>

## Best-Fit Applications

- Massive scale-out storage environments
- High-density data centers
- Mainstream enterprise external storage (SAN, NAS, DAS)
- Cloud bulk data storage
- Enterprise backup and restore—D2D, virtual tape
- Centralized surveillance
- High Density NAS Solutions



CAPACITY	MODEL NUMBER	SECTOR SIZE	INTERFACE	CACHE
6TB	ST6000NM0004	4KN	SATA 6Gb/s	128MB
6TB	ST6000NM0024	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0084 <sup>2,3</sup>	5xxE	SATA 6Gb/s	128MB
6TB	ST6000NM0014	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0034	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
6TB	ST6000NM0104 <sup>2,3</sup>	5xxE	12Gb/s SAS	128MB
5TB	ST5000NM0024	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0024	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
4TB	ST4000NM0034	5xxE	12Gb/s SAS	128MB
4TB	ST4000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
4TB	ST4000NM0033	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0073 <sup>2,3</sup>	5xxN	SATA 6Gb/s	128MB
4TB	ST4000NM0023	5xxN	6Gb/s SAS	128MB
4TB	ST4000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
4TB	ST4000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0033	5xxN	SATA 6Gb/s	128MB
3TB	ST3000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
3TB	ST3000NM0023	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
3TB	ST3000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0024	5xxE	SATA 6Gb/s	128MB
2TB	ST2000NM0044 <sup>2</sup>	5xxE	SATA 6Gb/s	128MB
2TB	ST2000NM0034	5xxE	12Gb/s SAS	128MB
2TB	ST2000NM0054 <sup>2</sup>	5xxE	12Gb/s SAS	128MB
2TB	ST2000NM0033	5xxN	SATA 6Gb/s	128MB
2TB	ST2000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
2TB	ST2000NM0023	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
2TB	ST2000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0033	5xxN	SATA 6Gb/s	128MB
1TB	ST1000NM0053 <sup>2</sup>	5xxN	SATA 6Gb/s	128MB
1TB	ST1000NM0023	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0043 <sup>2</sup>	5xxN	6Gb/s SAS	128MB
1TB	ST1000NM0063 <sup>2,3</sup>	5xxN	6Gb/s SAS	128MB

# Terascale™ HDD

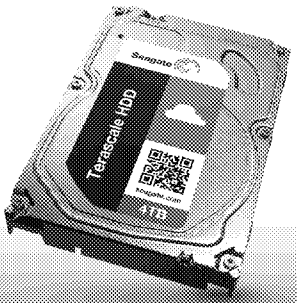
The Seagate Terascale HDD is designed for large Web-scale data centers where low-cost, low-power and high-capacity storage is critical.

## Key Advantages

- Affordable storage for 24x7 multi-drive replicated environments
- High vibration tolerance for reliable enterprise-class performance
- Low power and cooling costs with the lowest 3.5-inch enterprise drive operating power
- Advanced format logical block management for industry-leading data integrity

## Best-Fit Applications

- Web-scale computing
- Cloud storage servers and arrays
- Cloud backup storage
- Direct-attached external storage (DAS)
- Network-attached storage (NAS)



CAPACITY	5xx EMBLATION MODEL	INTERFACE	CACHE
4TB	ST4000NC000 <sup>4</sup>	SATA 6Gb/s	64MB
4TB	ST4000NC001	SATA 6Gb/s	64MB
3TB	ST3000NC002	SATA 6Gb/s	64MB
3TB	ST3000NC000 <sup>4</sup>	SATA 6Gb/s	64MB
2TB	ST2000NC001	SATA 6Gb/s	64MB
2TB	ST2000NC000 <sup>4</sup>	SATA 6Gb/s	64MB
1TB	ST1000NC001	SATA 6Gb/s	64MB
1TB	ST1000NC000 <sup>4</sup>	SATA 6Gb/s	64MB

1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
2 Self-Encrypting Drives (SED) and FIPS 140-2 Validated drives are not available in all models or countries.  
3 FIPS 140-2 in review. See FIPS 140-2 Level 2 Certificate at <http://www.nist.gov/groups/ST/comp/documents/140-1-140-tral2011.htm#16.35>  
4 Seagate Instant Secure Drive Mode







# Enterprise Performance 10K HDD

Seagate Enterprise Performance 10K HDDs deliver the optimal balance of capacity, performance and power in a 10K-RPM, 2.5-inch enterprise drive.

### Key Advantages

- Highest-capacity enterprise SFF hard drive (up to 1.2TB)
- PowerChoice™ technology reduces power consumption.
- Protection Information (PI) detects corruption of data in flight between the host system and the drive<sup>5</sup>
- Self-Encrypting Drive (SED)<sup>2</sup> and FIPS 140-2 certified SED<sup>3</sup> cut IT drive retirement costs and protect data at rest. FIPS options meet government encryption compliance standards.

### Best-Fit Applications

- Mission-critical servers and external storage arrays
- Power- and space-constrained data centers
- Compliance or data security initiatives



CAPACITY <sup>1</sup>	5-xx NATIVE MODEL	INTERFACE	CACHE
1200GB	ST1200MM0017 <sup>2</sup>	6Gb/s SAS	64MB
1200GB	ST1200MM0027 <sup>2,3</sup>	6Gb/s SAS	64MB
900GB	ST900MM0026 <sup>2</sup>	6Gb/s SAS	64MB
900GB	ST900MM0036 <sup>2,3</sup>	6Gb/s SAS	64MB
900GB	ST9900805SS	6Gb/s SAS	64MB
900GB	ST9900705SS <sup>2</sup>	6Gb/s SAS	64MB
900GB	ST9900605SS <sup>2,3</sup>	6Gb/s SAS	64MB
900GB	ST9900805FC	4Gb/s FC	64MB
600GB	ST600MM0026 <sup>2</sup>	6Gb/s SAS	64MB
600GB	ST9600205SS	6Gb/s SAS	64MB
600GB	ST9600105SS <sup>2</sup>	6Gb/s SAS	64MB
600GB	ST9600005SS <sup>2,3</sup>	6Gb/s SAS	64MB
600GB	ST9600205FC	4Gb/s FC	64MB
450GB	ST450MM0026 <sup>2</sup>	6Gb/s SAS	64MB
450GB	ST9450405SS	6Gb/s SAS	64MB
450GB	ST9450305SS <sup>2</sup>	6Gb/s SAS	64MB
450GB	ST9450205SS <sup>2,3</sup>	6Gb/s SAS	64MB
450GB	ST9450405FC	4Gb/s FC	64MB
300GB	ST300MM0026 <sup>2</sup>	6Gb/s SAS	64MB
300GB	ST9300605SS	6Gb/s SAS	64MB
300GB	ST9300505SS <sup>2</sup>	6Gb/s SAS	64MB
300GB	ST9300405SS <sup>2,3</sup>	6Gb/s SAS	64MB
300GB	ST9300605FC	4Gb/s FC	64MB

# Enterprise Performance 15K HDD

Seagate Enterprise Performance 15K HDDs leverage a 2.5-inch form factor to deliver pronounced performance advantages and power savings over legacy 3.5-inch drives.

### Key Advantages

- Stores 2× the Tier 1 data over previous generation without increasing drive count
- Enables Tier 1 applications to process transactions more quickly
- Best-in-class idle power for more efficient storage operations
- Industry's highest MTBF at 2M hours
- Self-Encrypting Drive (SED)<sup>2</sup> and FIPS SED<sup>4</sup> options cut IT drive retirement costs and help protect data at rest.

### Best-Fit Applications

- High-performance Tier 1 enterprise servers
- Blade, rack and tower servers hosting transaction-based applications
- Power- and space-constrained data centers
- Compliance and data security initiatives



CAPACITY <sup>1</sup>	5-xx NATIVE MODEL	INTERFACE	CACHE
300GB	ST9300653SS	6Gb/s SAS	64MB
300GB	ST9300553SS <sup>2</sup>	6Gb/s SAS	64MB
300GB	ST9300453SS <sup>2,3</sup>	6Gb/s SAS	64MB
146GB	ST9146853SS	6Gb/s SAS	64MB
146GB	ST9146753SS <sup>2</sup>	6Gb/s SAS	64MB
146GB	ST9146653SS <sup>2,3</sup>	6Gb/s SAS	64MB
146GB	ST9146852SS	6Gb/s SAS	16MB
146GB	ST9146752SS <sup>2</sup>	6Gb/s SAS	16MB
146GB	ST9146652SS <sup>2,3</sup>	6Gb/s SAS	16MB
73GB	ST973452SS	6Gb/s SAS	16MB
73GB	ST973352SS <sup>2</sup>	6Gb/s SAS	16MB
73GB	ST973252SS <sup>2,3</sup>	6Gb/s SAS	16MB

<sup>1</sup> One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.  
<sup>2</sup> Self-Encrypting Drive models may require TCG-compliant host or controller support.  
<sup>3</sup> See FIPS 140-2 Level 2 Certificate at <http://seagate.com/groupes/51M/comp/documents/140-1/1401vend.htm>.  
<sup>4</sup> FIPS 140-2 in review. See FIPS 140-2 Level 2 Certificate at <http://nrc.nist.gov/groupes/51M/comp/validation.html#F05>.  
<sup>5</sup> Protection Information (PI) feature requires PI-compliant host or controller support.





## 1200 SSD

The Seagate 1200 SSD delivers best-in-class performance and a rich enterprise feature set for demanding data center applications.

### Key Advantages

- Helps remove storage bottlenecks and close the gap between processor and data access performance
- Delivers the speed and performance consistency needed for demanding enterprise applications
- Designed to reduce data access wait times under the most complex, write-intensive workloads
- Ensures data availability for critical production systems by using redundant, failover I/O communication paths

### Best-Fit Applications

- IOPS-hungry enterprise applications, such as high-performance computing, online transaction processing and heavy data analytics
- Server-side caching acceleration in virtualized environments
- External enterprise storage solutions (SAN, NAS, DAS)



CAPACITY <sup>1</sup>	MODEL	INTERFACE	SECURITY
800GB	ST800FM0053 <sup>2</sup>	SAS 12Gb/s	SED
800GB	ST800FM0063 <sup>2,3</sup>	SAS 12Gb/s	FIPS 140-2
800GB	ST800FM0043	SAS 12Gb/s	
400GB	ST400FM0073 <sup>2</sup>	SAS 12Gb/s	SED
400GB	ST400FM0053	SAS 12Gb/s	
200GB	ST200FM0073 <sup>2</sup>	SAS 12Gb/s	SED
200GB	ST200FM0053	SAS 12Gb/s	

## Seagate Kinetic Open Storage Platforms

Seagate Kinetic Storage comprises storage devices + key/value API + Ethernet connectivity.

### Key/Value API and Tools Simplify Data Management

- Rapid implementation and deployment in any stack
- Take direct advantage of drive-specific features and capabilities.
- Talk directly to the device at the application level.
- Supports a new class of key/value + Ethernet drives, beginning with HDDs

### Improve Performance in Scale-Out Storage Architectures

The Seagate Kinetic Open Storage platform delivers higher performance and capacity, along with improved rack density, by allowing more flexibility than traditional storage server architectures.

- Simplify scale-out storage architectures
- Break away from the constraints of a legacy storage infrastructure
- Increase I/O efficiency by removing bottlenecks and overhead
- Optimize cluster management, data replication, migration and active archive performance

### Deliver Lower Data Center TCO

- Lowers capital expense (capex) associated with building new or upgrading an existing data center architecture
- Mitigates hardware risks associated with human error
- Lowers operational expense (opex) associated with running a data center
- Improves utilization of real estate where physical footprint is an issue



# Resources and Services

You're never on your own. Get expert advice, do-it-yourself tools, specs and more for all of our products. Seagate Data Recovery Services offers many options for getting your lost data back from all brands and types of storage media. Seagate Partners are eligible to join exclusive programs targeted to the needs of their businesses.

## Data Recovery

Data recovery is a highly technical, labor-intensive process of obtaining usable data from inaccessible storage media and corrupted or deleted file sets from a variety of digital storage media and devices. The process is carried out in a controlled environment using Class 100 clean rooms and Class 10 horizontal flow clean benches to protect client media and all recovery equipment from contamination.

Storage systems can fail in many ways, however, the data stored on them is not necessarily lost. The specific technique used to recover the information depends on the type of failure (file corruption, virus attack, mechanical or electrical problem, or human error). Sometimes these problems occur in combination. Seagate Recovery Services has full-service lab facilities that are prepared to address all failure modes using the industry's most advanced recovery technology and procedures.

### What Types of Media Can Seagate Recover Data From?

- Hard disk drives (all brands and interfaces)
- SSD and flash media
- USB/FireWire drives
- Tape storage (LTO, DLT, AIT, DAT, Travan)
- RAID (0, 1, 3, 4, 5, 6, 10, etc.)
- Servers and virtual machines (VMware, MS Hyper-V)

### Data Recovery Options

- **Seagate Recovery Services:** One-time fixed cost after occurrence of data failure
- **Seagate Rescue and Replace subscription plans:** Available in 2- and 3-year offerings at HDD point of sale.

## Partner Resources and Benefits

The Seagate Partner Program (SPP) provides access to unique resources and benefits to help channel partners secure new opportunities and grow revenue and profitability.

As a registered SPP member, you enjoy the following exclusive features:

- E-newsletter and regular news updates
- New product evaluation unit program
- Training and sales tools portal
- Priority support

Start reaping the rewards of SPP membership—register today at [www.seagate.com/www/partners](http://www.seagate.com/www/partners)

- Complete the online form.
- Click through and accept our standard agreement

 **Seagate**  
Partner Program

## Service and Support

For information regarding products and services, visit [www.seagate.com/about/contact-us/technical-support](http://www.seagate.com/about/contact-us/technical-support)

Available services include:

- Presales and Technical Support
- Global Support Services telephone numbers and business hours
- Authorized Seagate Service Centers

For information regarding Warranty Support, visit [www.seagate.com/support/warranty-and-returns](http://www.seagate.com/support/warranty-and-returns)

For information regarding Data Recovery Services, visit [www.seagate.com/services-software/](http://www.seagate.com/services-software/)

For Seagate OEM and Distribution partner portal, visit [www.seagate.com/www/partners](http://www.seagate.com/www/partners)

For Seagate reseller portal, visit [www.seagate.com/www/partners](http://www.seagate.com/www/partners)

[www.seagate.com](http://www.seagate.com)

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**Seagate Technology LLC**  
10200 South De Anza Boulevard  
Cupertino, California 95014  
408-658-1000



# **EXHIBIT 36**



1 SHEPPARD, MULLIN, RICHTER & HAMPTON LLP  
A Limited Liability Partnership  
2 Including Professional Corporations  
NEIL A.F. POPOVIC, Cal. Bar No. 132403  
3 ANNA S. McLEAN, Cal. Bar No. 142233  
TENAYA RODEWALD, Cal. Bar No. 248563  
4 LIEN H. PAYNE, Cal. Bar No. 291569  
JOY O. SIU, Cal. Bar No. 307610  
5 DANIEL R. FONG, Cal. Bar No. 311985  
Four Embarcadero Center, 17<sup>th</sup> Floor  
6 San Francisco, California 94111-4109  
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7 Facsimile: 415.434.3947  
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jsiu@sheppardmullin.com  
10 dfong@sheppardmullin.com

11 Attorneys for Defendant,  
SEAGATE TECHNOLOGY LLC  
12  
13

14 UNITED STATES DISTRICT COURT  
15 NORTHERN DISTRICT OF CALIFORNIA, SAN FRANCISCO DIVISION  
16

17 IN RE SEAGATE TECHNOLOGY LLC  
LITIGATION

18  
19 CONSOLIDATED ACTION  
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Case No. 3:16-cv-00523-JCS

**DECLARATION OF TENAYA M.  
RODEWALD IN SUPPORT OF SEAGATE  
TECHNOLOGY LLC'S OPPOSITION TO  
PLAINTIFFS' ADMINISTRATIVE  
MOTION FOR LEAVE TO FILE  
SECOND SUPPLEMENTAL BRIEF IN  
SUPPORT OF CLASS CERTIFICATION**

**Date:** June 15, 2018  
**Time:** 9:30 a.m.  
**Place:** Courtroom G  
**Judge:** Hon. Joseph C. Spero

Second Consolidated Amended Complaint  
filed: July 11, 2016



DECLARATION OF TENAYA RODEWALD

I, Tenaya Rodewald, declare as follows:

1. I am an attorney duly admitted to practice before this Court. I am an attorney with Sheppard, Mullin, Richter & Hampton LLP, attorneys of record for Defendant, Seagate Technology LLC (“Seagate”).

2. If called as a witness, I could and would competently testify to all facts within my personal knowledge except where stated upon information and belief.

3. This declaration is submitted in support of Seagate’s Opposition to Plaintiffs’ Administrative Motion to for Leave to File Second Supplemental Brief in Support of Class Certification.

4. I reviewed Plaintiffs’ Exhibit 72 submitted in support of their proposed Second Supplemental Brief. I also reviewed each of the documents cited in Exhibit 72, and Plaintiffs’ Exhibits 73 – 77.

5. I prepared the table attached hereto as **Exhibit 1**, which responds to each of the rows and documents in Plaintiffs’ Exhibit 72, as well as Plaintiffs’ Exhibits 73 – 77. The statements under “Seagate’s Response” in the last column of Exhibit 1 hereto are based on my personal examination of the documents discussed therein, and accurately report my observations.

6. As stated in Exhibit 1, rows 3, 6, 7, 11, 16, and 22, I found the reviews cited by Plaintiffs in Seagate’s documents FED\_SEAG0076936, FED\_SEAG0076615, FED\_SEAG0076609, FED\_SEAG0094986, FED\_SEAG0094984, FED\_SEAG0076421, and followed the links in those Seagate documents to the actual reviews on the Amazon.com website. Attached hereto as **Exhibits A – E, G, I, K** are true and correct copies of those linked reviews as published on Amazon.com.

7. I searched Amazon.com for hard drive products from any manufacturer. I clicked on various products from companies other than Seagate that had a substantial number of reviews (over 100). I easily found the product review summaries attached hereto as **Exhibit J**.

8. **Exhibits H and L** hereto are true and correct copies of documents Seagate produced in this action.

1                   9.       **Exhibit F** is a printout of the first 41 rows and first 12 columns of document  
2 FED\_SEAG0093490.

3                   10.     Plaintiffs deposed Seagate's witnesses Alan Clark about 1-star review  
4 monitoring on October 20, 2017.

5                   11.     On August 9, 2017 Seagate provided its Second Amended Response to  
6 Plaintiffs' Interrogatory No. 10 listing the specific model numbers for the External Products that  
7 contained the ST3000DM001 Drive.

8                   I declare under penalty of perjury under the laws of the United States of America that  
9 the foregoing is true and correct.

10                  Executed on this 11th day of June, 2018, at Brussels, Belgium.

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12

/s/ Tenaya Rodewald  
Tenaya Rodewald

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## ATTESTATION

Pursuant to Civil Local Rule 5-1(i)(3), I, Anna S. McLean, attest that the signatory of this document, and on whose behalf the filing is submitted, concurs with the filing's content and has authorized the filing.

SHEPPARD, MULLIN, RICHTER &amp; HAMPTON LLP

By

---

/s/ *Anna S. McLean*

ANNA S. McLEAN

Attorneys for SEAGATE TECHNOLOGY, LLC

**EXHIBIT 1**

## REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

<u>Row in Plaintiffs' Ex. 72 or Exhibit</u>	<u>Document Cited by Plaintiffs</u>	<u>Plaintiffs' Description</u>	<u>Seagate's Response</u>
1	FED_SEAG0076611	Internal Seagate Spreadsheet tracking customer complaints for 30 days on Twitter	This document cannot relate to the Drives because it covers 2011-02-01 to 2011-03-01 — which is <i>before the ST3000DM001 was manufactured</i> . See ECF No. 150-6 (Almgren Decl.), ¶ 11 (ST3000DM001 first approved for manufacture on April 28, 2011).
2	FED_SEAG0093297	Seagate document recording customer reviews on Amazon from 1/1/2011 to 4/7/2011	This document cannot relate to the Drives because it is dated 2011-04-06 — which is <i>before the ST3000DM001 was manufactured</i> . See ECF No. 150-6 (Almgren Decl.), ¶ 11 (ST3000DM001 first approved for manufacture on April 28, 2011).
3	FED_SEAG0076936	Internal Seagate document tracking 954 negative customer reviews for drives on Amazon, Bazaarvioce , and Best Buy between 2011 and 2012.	This document references numerous products and sizes of drives not at issue in this litigation. Plaintiffs quote three “example reviews.” <i>None of them relates to the Drives at issue</i> . The first two are Amazon reviews attached hereto as <b>Exhibit A</b> . They are for 2TB products. Plaintiffs cut off the remainder of the third review in which the reviewer specifies that the review is for a 1TB drive – the “barracuda 720012 <u>1TB</u> sn. 6VPAGXJA” – not the 3TB ST3000DM001 Drive at issue in this litigation. In addition, the comment is dated 8/21/2011, and the ST3000DM001 was not approved for manufacture as a “Barracuda” Internal drive product until October 18, 2011. See, e.g., ECF No. 133-5, fn. 3; ECF No. 152-3, ¶ 4 (“Barracuda” was an Internal product); ECF No. 150-6, ¶ 18 (ST3000DM001 not approved for manufacture as an Internal drive until October 2011). Accordingly, the third review also does not relate to the ST3000DM001. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.
4	FED_SEAG0093523	Spreadsheet detailing 46,960 customer email complaints to Seagate	The table relates to at least 54 different products, <i>more than half of which (at least 29) are not at issue</i> . In addition, while the table contains over 46,000 rows, many rows relate to the same customer and drive (same serial number). For example, 11 rows relate to a drive with serial number S1F07CPR; 8 rows

## REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

Row in Plaintiffs' Ex. 72 or Exhibit	Document Cited by Plaintiffs	Plaintiffs' Description	Seagate's Response
			<p>relate to a drive with serial number S1F07MVQ, <i>etc.</i> Furthermore, a large number of the contacts are <i>not complaints</i>. For example, one exchange involves a customer inquiring “I am looking for a second power cable since the first was lost;” another asks “Is it possible to purchase the Seagate GoFlex Home Network base and use it with the hard disk drive?;” another asks “Does the Windows version of this software includes a means by which to override the sleep settings?;” another reports “Thank you, the problem is finally solved. Your support has been most appreciated.” None of these interactions relate to drive failures. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.</p>
5	FED_SEAG0076706	Internal Seagate document tracking Expansion reviews Amazon, noting that Drive Failures are most common complaint	<p>This document contains reviews for multiple sizes of drives not at issue in this litigation, including 750 GB, 500 GB and 1TB products. Plaintiffs claim that drive failures are the most common complaint, and reproduce [REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED] Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.</p>
6	FED_SEAG0076615	Internal Seagate document tracking Expansion reviews Amazon, noting that Drive Failures are most common complaint	<p><b>This is the same document as FED_SEAG0076706, discussed in the row above.</b> Plaintiffs quote two reviews. <b>Exhibit B</b> hereto is a true and correct copy of the second review Plaintiffs quote. The review is for a 1TB “portable” drive, at issue in this action. The other review is for the Seagate Expansion Desk 3TB product, for which Amazon shows <b>62% 5-star reviews and only 13% 1-star reviews</b>. See <b>Exhibit C</b> hereto. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.</p>
7	FED_SEAG0076609	Internal Seagate document tracking	<p>This document covers numerous products and sizes of drives not at issue (including wireless products, portable products and other product types, sizes</p>

## REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

<u>Row in Plaintiffs' Ex. 72 or Exhibit</u>	Document Cited by Plaintiffs	Plaintiffs' Description	Seagate's Response
		1,738 Amazon reviews and Seagate's public responses	and categories). Plaintiffs cite three reviews that appear to relate to products at issue. The document contains links to the reviews on Amazon's website. Two reviews relate to the Seagate Expansion Desk 3TB product, <i>for which Amazon shows 62% 5-star reviews and only 13% 1-star reviews</i> . Copies of these reviews on Amazon's website are attached hereto as <b>Exhibit D</b> . The third relates to the Seagate Backup Plus 3TB product, for which Amazon shows <i>51% 5-star reviews and only 23% 1-star reviews</i> . A copy of these reviews on Amazon's website is attached hereto as <b>Exhibit E</b> . As explained in row 16, these rates of 1-star reviews are similar to those for hard drives from other companies. Plaintiffs provide no evidence that any of this information is capable of demonstrating an unreasonably high failure rate.
8	FED_SEAG0093489	Seagate spreadsheet detailing direct customer complaints	This document covers numerous products and sizes of drives not at issue (including wireless products and even products from other manufacturers). Plaintiffs cite one customer message about an "Expansion Desk" but there is no evidence this customer's comment related to the 3TB ST3000DM001 Drive. The Expansion Desk came in at least four sizes (from 1TB to 4TB) (ECF No. 152-3, Ex. 22 at FED_SEAG0070325) and only the 3TB version is at issue in this litigation. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.
9	FED_SEAG0093490	Spreadsheet detailing 102,135 customer complaints to Seagate – all complaints are for drives at issue	Plaintiffs' claims about this document are false. This document is an Excel spreadsheet with 102,135 <i>rows</i> . The rows relate to <i>58 different products</i> , only 6 of which are at issue and <i>52 of which are not</i> because they did not contain the ST3000DM001 Drives. The six at-issue products have model numbers STBM3000100, STBN6000100, STBP12000100, STBV3000100, STBV3000200, STCP3000100. These are the 1, 2, or 4 Bay "NAS" products and Seagate Expansion Desk and Seagate Expansion Desk Plus products. The rows that relate to at-issue products can easily be determined by consulting the fourth column of the table, which lists the model numbers of the products.



## REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

<u>Row in Plaintiffs' Ex. 72 or Exhibit</u>	<u>Document Cited by Plaintiffs</u>	<u>Plaintiffs' Description</u>	<u>Seagate's Response</u>
12	FED_SEAG0086798	Internal chart on corporate escalations of customer complaints	This document addresses multiple products and does not specify any sizes for any products. There is no evidence that any entries in the document relate to the ST3000DM001 Drive and there is no evidence that the quoted comment relates to the Drive. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.
13	FED_SEAG0093307	Email between Seagate employees discussing the difficulty keeping up with warranty claims for 3TB drives	Plaintiffs misrepresent this document. It is from Seagate's recovery service, which recovers data from drives. A complete copy of this document is attached hereto as <b>Exhibit H</b> (FED_SEAG0093307). As Plaintiffs have argued, the recovery service <i>was not part of Seagate's warranty process</i> , but was a separate service for which Seagate charged. ECF No. 62 (Complaint), ¶ 126; <i>see also</i> <a href="https://www.seagate.com/services-software/recover/">https://www.seagate.com/services-software/recover/</a> . [REDACTED] [REDACTED] [REDACTED] It is unclear what this comment means, but since Seagate Recovery Service was separate from Seagate's normal warranty process, it is irrelevant. <i>Id.</i> [REDACTED] [REDACTED] (Ex. H, last page), [REDACTED]
14	FED_SEAG0090931	Internal chart on direct complaints from customers	This document contains entries relating to numerous products not at issue. Plaintiffs quote two "Sample Complaints." There is no evidence that the first relates to a product at issue in this action. Furthermore, Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.
15	FED_SEAG0090915	Internal chart on direct complaints from customers	Column Z of this Excel table clearly lists the model number of the product at issue in each row. The chart contains data on 419 different products (419 different model numbers), only 22 of which are at issue in this Action. I

## REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

Row in Plaintiffs' Ex. 72 or Exhibit	Document Cited by Plaintiffs	Plaintiffs' Description	Seagate's Response
			<p>extracted the rows for the products at issue in this Action. There were only 112 rows relating to the products at issue. Furthermore, the focus of the chart is the results of asking customers to rate Seagate's customer support. Thus, many of the alleged “complaints” aren't complaints about drives at all but instead are comments about customer service, such as “Very patient and worked with me until problem was solved;” “He spent a great deal of his time to troubleshoot and resolve my issue with reinstalling software on my recently upgraded OS;” and the like. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.</p>
16	FED_SEAG0094984	Internal Seagate document comparing 1 star reviews for negative reviews products; ST3000DM001 has most	<p>This document relates to reviews. Plaintiffs claim the ST3000DM001 had “the most” 1-star reviews, but do not discuss whether the ST3000DM001 also had the most reviews overall, nor <i>what percent</i> of reviews were 1-star. The document contains links to the products reviewed on the Amazon website. The ST3000DM001 product reviewed is the 3TB Desktop HDD (one of the Internal products). As shown in <b>Exhibit I</b>, this product had 61% 5-star reviews and only 17% 1-star reviews—3.6 times more 5-star than 1-star reviews. Furthermore, this <i>percentage</i> of 1-star reviews does not appear unusual for hard drives. Attached hereto as <b>Exhibit J</b> are snapshots of the review distributions for a number of hard drives from various companies. These products from Iomega, Toshiba, Western Digital and HGST have 15% to 21% 1-star reviews (and 54% to 65% 5-star reviews)—no different from the products containing the ST3000DM001 Drives. Plaintiffs also present a chart of [REDACTED] Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.</p>

## REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

<u>Row in Plaintiffs' Ex. 72 or Exhibit</u>	<u>Document Cited by Plaintiffs</u>	<u>Plaintiffs' Description</u>	<u>Seagate's Response</u>
			<p><i>the ST3000DM001</i>. Both relate to 5TB drives not at issue.</p> <p>The document contains links to the third party websites containing the customer reviews. I searched and found the two “sample complaints” Plaintiffs quote. I followed the links to the actual websites containing these reviews. Attached hereto as <b>Exhibit K</b> are copies of the actual reviews printed from Amazon.com showing they relate to a 5TB product not at issue. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.</p>
23	FED_SEAG0084392 [sic] actual document is FED_SEAG0084329	Internal discussion at Seagate regarding information on website about drives	<p><b><i>This document is not new.</i></b> The email Plaintiffs cite was produced as part of four different documents in Seagate's third production in <b><i>September, 2016</i></b> (FED_SEAG0000707, FED_SEAG0000775, FED_SEAG0000781, FED_SEAG0024658). The email chain relates to the layout of Seagate's website, and how to better present information. A complete copy of this document is attached hereto as <b>Exhibit L</b> (FED_SEAG0084329). It has no relevance.</p>
24	FED_SEAG0093285	Seagate document recording customer service chats with potential customers	Plaintiffs admit this document relates to “ <b><i>potential</i></b> ” customers. The “chat” they reproduce is multiple hearsay, apparently not based on the potential customer's personal knowledge, and is not evidence of any failures or failure rate.
25	FED_SEAG0090943	Seagate spreadsheet detailing direct customer complaints	<p>This document contains entries relating to numerous products not at issue; it does not contain any rows relating to model numbers or sizes, so one cannot tell whether any particular entries relate to the Drives. Plaintiffs quote one comment. There is no evidence this comment relates to the ST3000DM001. Furthermore, the comment indicates that Seagate did not consistently publish AFRs for drives, and could not have made an affirmative misrepresentation to this customer. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.</p>

## REDACTED VERSION OF DOCUMENT SOUGHT TO BE SEALED

<u>Row in Plaintiffs' Ex. 72 or Exhibit</u>	<u>Document Cited by Plaintiffs</u>	<u>Plaintiffs' Description</u>	<u>Seagate's Response</u>
26	FED_SEAG0090903	Seagate spreadsheet detailing direct customer complaints	The document covers numerous products not at issue. Without reviewing every entry, it is not possible to tell whether any of them relate to the Drive. Plaintiffs quote one comment. There is no evidence that the quoted comment relates to the Drive. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.
27	FED_SEAG0090915	Seagate spreadsheet detailing direct customer complaints	This is the same document (FED_SEAG0090915) as in row 15. (See row 15 above.) It contains information on 419 different products, only 22 of which are at issue. Plaintiffs quote three "Sample Complaints" -- two of which (the first and third) <b>do not relate to the ST3000DM001</b> . Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.
28	FED_SEAG0090966	Seagate spreadsheet summarizing all Amazon reviews for 2TB, 3TB and 4TB drives	<b><i>This document is not new.</i></b> Seagate produced the same document-- <b><i>including the bar graph Plaintiffs reproduce in their Exhibit 72</i></b> --in its production 25 on 6/16/2017 (FED_SEAG0053031). Furthermore, the document and graph are from 2015 and apparently covers all 3TB "ST" drives--labeled as "STX" drives in the spreadsheet. As discussed in row 19, by 2014, Seagate was selling at least <b><i>12 other 3TB hard drives</i></b> with "ST" model numbers. There is no way to determine how many of the <b><i>reviews</i></b> referenced relate to the Drives at issue. Furthermore, the percentage of 1-star reviews apparently fluctuated significantly over time and between different products and different websites. It may be listed as [REDACTED] in this chart, but it is 13% and [REDACTED], at other times and in other contexts. See rows 7 and 19. Plaintiffs provide no evidence that this document could be used to determine a failure rate for the Drives.
<b><i>The Rows below contain Seagate's response to Plaintiffs' Exhibits 73 – 77</i></b>			
Plaintiffs' Exhibit 73	FED_SEAG0072969 [sic]	<u>Plaintiffs' claim:</u> "in Seagate's newly produced marketing	Plaintiffs misrepresent and misquote the document. The document compares and contrasts "emerging markets" vs. "developed markets." It explains, "[REDACTED]"

**EXHIBIT B**

NEW & INTERESTING FINDS ON AMAZON EXPLORE

amazon prime

Deliver to Tenaya Palo Alto 94301

Departments Your Pickup Location

EN Hello, Tenaya Account & Lists Orders Prime Cart

Prime Video Channels

## Customer Review

★★★★★ Dead after 2 days

By Ice on January 7, 2013

Capacity: 1 TB | Verified Purchase

After 2 days faint beeping sound, won't recognize.

Don't have access to my data.

Seagate wants for recovery \$599.00 - \$1800.00+.

One person found this helpful

Helpful

Comment

Report abuse

Permalink

Posting publicly as: Amazon Customer

Insert product link

What's this?

Talk about why you like this review, or ask a question.

Guidelines

Post a comment

## Product Details



Seagate Expansion 1TB Portable External Hard Drive by Seagate

★★★★★ 3,696

4.5 out of 5 stars



\$164.59 - \$202.59





See All Buying Options

Add to Wish List

## Your recently viewed items and featured recommendations





Customers also shopped for

Page 1 of 13

			
Compatible/replacement power supply adapter for 12V Seagate SRD00F2 External hard drive... ★★★★★ 38 \$10.99	Seagate Expansion 3TB Desktop External Hard Drive USB 3.0 (STEB3000100) ★★★★★ 7,044 \$86.93	HQR 12V AC Adapter for Seagate 3TB SRD00F2 External Hard Drive Adaptor Power... ★★★★★ 9 \$8.91	Seagate Backup Plus 3TB Desktop External Hard Drive USB 3.0 (STDT3000100) ★★★★★ 2,733 \$189.00

Inspired by your purchases

Page 1 of 13

			
EU General Data Protection Regulation (GDPR): An ITGP Privacy Team Kindle Edition \$49.99	Augbunny Heavy Duty 100% Cotton Canvas Zipper Beach Shoulder Grocery Tote Bag With Outer... ★★★★★ 43 \$16.65 - \$17.99	Data Privacy Law: A Practical Guide G. E. Kennedy Kindle Edition ★★★★★ 5 \$49.99	Totes Women's Ruffle Stick, White ★★★★★ 41 \$14.99



**EXHIBIT C**

NEW & INTERESTING FINDS ON AMAZON EXPLORE

amazon prime

Deliver to Tenaya Palo Alto 94301

Departments Your Pickup Location

EN Hello, Tenaya Account & Lists Orders Prime Cart

Prime Video Channels

## Customer Review

The manufacturer commented on the review below

☆☆☆☆☆ **Not reliable**

By [songster1928](#) on January 8, 2013

Size: 3 TB | **Verified Purchase**

I purchased this 3 TB Seagate drive in October. Used it as a data backup for photographs, keeping the drive on my desk (not moving it) so in good conditions for such equipment. (I carry smaller drives in my backpack while traveling with my camera and laptop. After ten weeks the drive stopped working.

Under warranty, Seagate will replace the drive, but they want me to pay them to try to recover the data. Personally I don't think this is acceptable.

I find the lack of reliability and Seagate's unwillingness to warrant the function of the drive -- data storage -- unacceptable.

People who read this review can also read Seagate's offer reaching out to me. Let me provide an update on the resolution of this matter.

I wrote my review while on hold for the third time with Seagate -- in my initial call to them I spent about 45 minutes on hold. At the time I wrote the review, Seagate's position -- as expressed by first line CSR and second line manager was that they would replace my drive but not take responsibility for data recovery. I eventually got to a next level manager who agreed that Seagate would cover the data recovery and passed me to Tech Support (who were much more pleasant than Customer Service) who listened to my assessment (which proved correct) that the problem was in the power system, not the memory and there was no reason to write off the data or charge to recover it.

Two subsequent calls to Technical Support (long wait on hold but pleasant interactions) got to the root of the problem, got my data back and since the drive is flakey -- Seagate is replacing it.

So, what to conclude. I've done enough Call Center design to know that most people would accept (begrudgingly) the first line or second line refusal from Seagate to fix my problem. Since I was willing to sit on hold for 45 minutes and argue with Seagate at length they did agree to fix my problem. Since I took the time to write a one star review on Amazon I got another offer to fix the problem from Seagate. SO SEAGATE WILL ADDRESS YOUR PROBLEM BUT NOT IF YOU ASK POLITELY! That's my conclusion Seagate is free to file another answer saying they disagree. But they recorded my calls "for training purposes" and as far as I am concerned, once the first escalation led to Seagate saying "no" to me again I knew the only way to get service was to tough it out with them. I find this is almost always the case with customer service today, not just at Seagate, you have to be prepared to invest time and stand your ground to get anything.

What a sorry state customer service is in in America. And no I don't feel like thanking Seagate for addressing my problem, they made me spend far too much time on it.

505 people found this helpful

Helpful

50+ comments

Report abuse

Permalink

Comment

The manufacturer commented on this review (What's this?)

[Seagate Support](#) MANUFACTURER 5 years ago

Report abuse

Dear Songster1928,

This reply is from Seagate Support. We noticed your review and wanted to apologize for the problems experienced with your Expansion Desktop drive. It is unclear from the review details what the exact problem was with this drive. We would like to talk with you in greater detail to determine the root cause and available resolution to the problem. We have created a case based on your Amazon name that shows your review and our response. Here is a web address with contact information to speak with a support representative directly:

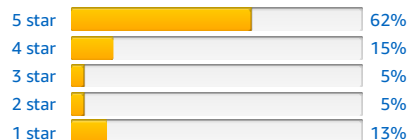
### Product Details



(OLD MODEL) Seagate Expansion 3TB D by Seagate

☆☆☆☆☆ 5,693

4.0 out of 5 stars



\$189.00 - \$371.59

See All Buying Options

Add to Wish List

<http://seagate.com/support/contact-support/>

You are not obligated to use our data recovery service if it is determined that data recovery is needed.

Best Regards,  
Seagate Support

Showing 5 comments

Sort by: **Newest** Oldest

**Old Timer 73** 2 years ago

[Report abuse](#)

A free program called Recuva is very good at recovering most lost files. FYI.

♥ [Leave a reply](#)

**Wildness** 2 years ago | In reply to [an earlier post](#)

[Report abuse](#)

If this was a backup then I fail to understand why you mentioned that you needed to recover the data? Get the free replacement and do a new backup.

♥ [Leave a reply](#)

**sabre03** 2 years ago | In reply to [an earlier post](#)

[Report abuse](#)

If the unit you had was defective, and it was backed up, what is the complaint? They offered to do a data recovery on the drive, and you should have been able to return it for a refund or get it replaced. Either way you have your data. If you want to represent all of the similar model drives as being unreliable, I don't see that happening seeing that it looks like others have used them with little or no problems.

♥ [Leave a reply](#)

**songster1928** 2 years ago | In reply to [an earlier post](#)

[Report abuse](#)

Years pass and people continue to chance upon this review with no better wY to spend their time chastising my review. Yet no one seems to have read the review before jumping in to defend Seagate.

I should have backed up the drive? First of all, it was backed up. Second, what should I back up the drive onto. Seagate sold it as a backup drive. The important word here is backup. If this is NOT the correct media for backups, what is?

Second, the drive was three weeks old. How long should I expect a product to perform it's advertised purpose?

Third: while every critic implies I am not good with technology because, as they claim erroneously, I did not back up, NOT ONE notices that I diagnosed the situation correctly, and much of my struggle with Seagate was their refusal to recognize that I had figured out the problem was in the power supply. The Seagate position that the data was lost was wrong. Why does mp not one of these critics ever notice that I figured out the real problem and had to browbeat Seagate into accepting my accurate technical assessment.

Fourth every writer asserts that no drive maker warranties data and I am in error to accept so. But my review points out that THIS IS WRONG. Seagate says they will to recover data BUT they did so with me when I insisted. My critics are all contradicted by what actually happened.

Several critics bak, I concluded that this pattern of random criticism, and the consistency in which critics misread or distort my review is part of a campaign by Seagate to harass critics. Nothing has happened to change my assessment.

My request of the next flamer is two-fold. Come up with a new critical slant rather than regurgitating talking points. And second, write from my review and not Seagate's script.

♥ [Leave a reply](#)

**Wildness** 2 years ago

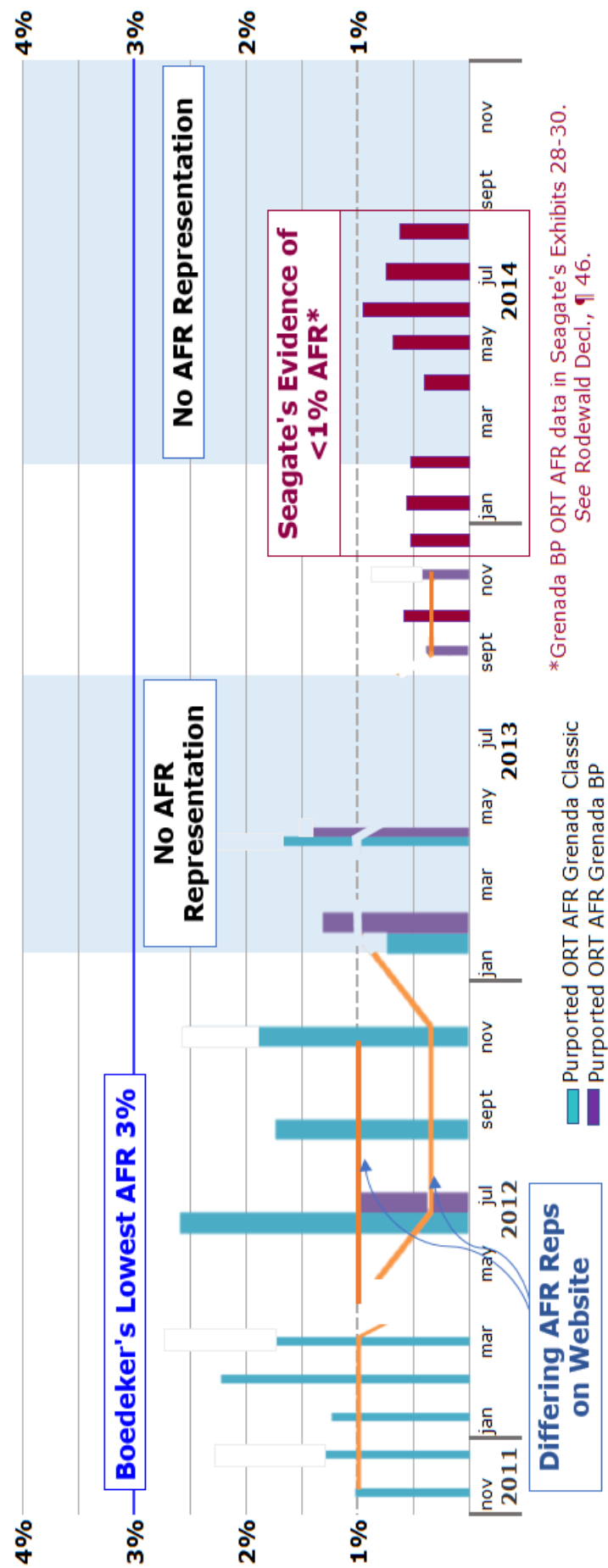
[Report abuse](#)

I'm very surprised that they were willing at all to cover data recovery. No hard drive manufacturer warrants the data on the drive only the hardware itself. It is the responsibility of the user to maintain data backups. I see reviews all over Amazon that seem to blame the manufacturer for loss of data that has never been backed up; the funniest of these are those that cry that this isn't the first time a drive has destroyed data they didn't have backed up. If drives are unreliable, then that is worth reviewing... if data is backed up, stop blaming the hardware manufacturer.

♥ [Leave a reply](#)

# **EXHIBIT 37**

**Corrected Version of Plaintiff's Graph on Motion p. 9**  
(See Rodewald Decl., ¶ 46)



**Factory ORT AFR Data for Grenada BP from Seagate Exhibits 28-30**

			Calendar		
Rodewald Exhibit	Fiscal Week	ORT AFR	Year	Mo.	Av. ORT AFR
Ex. 28	1413	0.86	2013	Oct.	<b>0.67</b>
	1414	0.65			
	1415	0.62			
	1416	0.56			
	1417	0.52		Nov.	<b>0.45</b>
	1418	0.56			
	1419	0.51			
	1420	0.46			
	1421	0.28			
	1422	0.28			
Ex. 29	1423	0.71	2014	Dec.	<b>0.53</b>
	1424	0.7			
	1425	0.48			
	1426	0.46			
	1427	0.6		Jan.	<b>0.58</b>
	1428	0.58			
	1429	0.64			
	1430	0.51			
	1431	0.51		Feb.	<b>0.54</b>
	1432	0.47			
Ex. 30	1433	0.58	2014	Apr.	<b>0.42</b>
	1434	0.59			
	1441	0.51			
	1442	0.44		May	<b>0.73</b>
	1443	0.32			
	1444	0.57			
	1445	0.7		Jun.	<b>0.93</b>
	1446	0.78			
	1447	0.87			
	1448	0.96		Jul.	<b>0.77</b>
	1449	0.86			
	1450	0.97			
	1451	0.91		Aug.	<b>0.68</b>
	1452	0.97			
	1502	0.83			
	1503	0.7			
	1504	0.65			
	1505	0.68			



# **EXHIBIT 38**

1 SHEPPARD, MULLIN, RICHTER & HAMPTON LLP  
A Limited Liability Partnership  
2 Including Professional Corporations  
NEIL A.F. POPOVIĆ, Cal. Bar No. 132403  
3 ANNA S. McLEAN, Cal. Bar No. 142233  
TENAYA RODEWALD, Cal. Bar No. 248563  
4 LIÊN H. PAYNE, Cal. Bar No. 291569  
JOY O. SIU, Cal. Bar No. 307610  
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Facsimile: 415.434.3947  
7 Email: npopovic@sheppardmullin.com  
amclean@sheppardmullin.com  
8 trodewald@sheppardmullin.com  
lpayne@sheppardmullin.com  
9 jsiu@sheppardmullin.com

10 Attorneys for Defendant,  
SEAGATE TECHNOLOGY LLC  
11

12 UNITED STATES DISTRICT COURT

13 NORTHERN DISTRICT OF CALIFORNIA, SAN FRANCISCO DIVISION  
14

15 IN RE SEAGATE TECHNOLOGY LLC  
LITIGATION

16  
17 CONSOLIDATED ACTION  
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Case No. 3:16-cv-00523-JCS

**DECLARATION OF HARRIE NETEL IN  
SUPPORT OF SEAGATE'S OPPOSITION  
TO PLAINTIFFS' MOTION FOR CLASS  
CERTIFICATION**

**Date:** March 30, 2018  
**Time:** 9:30 a.m.  
**Place:** Courtroom G  
**Judge:** Hon. Joseph C. Spero

Second Consolidated Amended Complaint  
filed: July 11, 2016

DECLARATION OF HARRIE NETEL

I, Harrie Netel, declare as follows:

1. I have personal knowledge of the facts set forth herein, which are known by me to be true and correct, and if called as a witness, I could and would competently testify thereto.

2. I received my Masters in Physics from the University of Twente, The Netherlands in 1994 and my PhD in Physics from the University of Twente, The Netherlands in 1999.

3. I was employed by Lawrence Livermore National Laboratory (as a physicist) from 1994 to 1999 and then by General Electric (“G.E.”) from 1999 to 2005. While at G.E., I initially worked as a physicist and later in six sigma with a focus on quality and reliability engineering for the manufacture of medical equipment, specifically, computed tomography (“CT”) scanners. From 2005 to the present, I have been employed by Seagate Technology, LLC (“Seagate”). From 2005 to 2011, I worked initially as a Principal Six Sigma Master Black Belt and later as the Director of Field Quality Analytics in Seagate’s Longmont, Colorado facility. In these roles, I led teams using empirical, statistical methods to measure and improve Seagate’s product Quality and Reliability by identifying and removing the causes of defects in products and minimizing variability in manufacturing, the supply chain or in some cases even our customers’ processes. In January 2012, I moved to China and became Director of Operations Quality and Analytics, and in August 2013 I was promoted to Senior Director Operations Quality and Analytics. While in China I was initially stationed in Suzhou, China and since January 2017 in Wuxi, China. My current role is to ensure the outgoing Quality of all Seagate’s hard drives meets our customers’ requirements. My current responsibilities include Supplier Quality Engineering (for incoming components), Factory Quality (for Seagate’s outgoing quality control) as well as Factory and ODM Customer Technical Support.

4. Since March 2015, I have supervised Seagate’s “ongoing reliability testing” or “ORT,” which refers to Seagate’s process of assessing and improving the ongoing reliability performance of the products shipped from Seagate’s factories. ORT begins once products are approved for sale to customers. I also supervise other types of post-release testing Seagate performs, including Outgoing DPPM Testing (ODT) and Periodic Design Margin Testing (PDMT).

1 reliability analysis (Weibull analysis). Using the software, Seagate performed a Maximum  
2 Likelihood Estimation (“MLE”) to fit a Weibull distribution to Seagate’s actual test data and  
3 estimate Beta (the shape parameter) and Eta (the scale parameter). In my experience, Maximum  
4 Likelihood Estimation is a very common method for estimating Weibull parameters from  
5 accelerated testing data. Beta and Eta were then used to calculate the projected MTBF, and AFR  
6 was calculated using expected power-on hours per year (“POH”) for the product.

7 19. Finally, if the AFR value exceeded the trigger limit, Seagate would issue a ship hold  
8 to address any problems before continuing to ship drives. In other words, Seagate did not ship  
9 drives to customers or consumers if the ORT testing indicated the AFR was above the trigger limit  
10 for the product at issue. However, since drives were placed in ORT testing on a rolling basis, a fix  
11 might be implemented while “pre fix” drives were still in testing. Thus, “raw” AFR could continue  
12 to appear above the trigger threshold even after the fix had been implemented. In other words, the  
13 reported AFR in documents could be higher than the actual AFR of drives shipped to consumers for  
14 two reasons: (1) the reported AFR is the AFR that triggered the ship hold, but since a ship hold was  
15 issued the drives at issue were not reaching consumers, and the drives that reached consumers after  
16 the hold had an implemented fix and a lower AFR; (2) even after a fix was implemented, it could  
17 take time for the fixed drives to make their way into testing and bring down the “raw” AFR to match  
18 the AFR of drives being shipped to consumers.

19 20. In numerous places, Hospodor assumes or claims that Seagate ‘selected,’ ‘assumed’  
20 or utilized a pre-selected Weibull Beta value when calculating AFR for the Grenada drives and  
21 products. This is not the case. For ORT testing of Grenada products, Seagate did not pre-select or  
22 assume a Beta value. Seagate determined the Beta value (and the AFR) from the actual test data for  
23 a specific population of drives using the method I describe above.

24 **B. Responses to Paragraphs 84, 127-155 of the Hospodor Declaration**

25 21. In Paragraph 84, Hospodor discusses the June 4, 2012 results of ongoing reliability  
26 testing (ORT testing) on the Grenada *Classic* drives. (See Ex. 4 [FED\_SEAG0026751] at p.  
27  
28

25. Similarly, even after initial approval for production, Seagate will continuously try to improve yields, lower costs of production, improve manufacturability and improve quality. These changes will also be reflected in ECRs. Over time the product may be modified and optimized for different uses, for inclusion in different products, for use with different peripherals or software, and to add features. All of these changes will be reflected in ECRs—all subject to the appropriate testing described above. Thus, the number of ECRs does not indicate a low quality product, but simply Seagate’s ongoing optimization of product for lower cost, higher yield, higher quality, better manufacturability, different uses, changing demands, added features or other improvements, etc.

26. For all of the above reasons, the total number of ECRs (1023 according to Hospodor) is not surprising to me. The number is not particularly unusual in my experience. It is also not surprising that many may have occurred after SBS shipping approval in April 2011 and/or after disty/OEM shipping approval in October 2011.

27. I do not understand what Hospodor means when he claims in Paragraphs 130, 134 and 135 that the Grenada Classic was “unstable.” If he means that the product sold to consumers was defective or low quality, he is wrong. As explained above and below, the drives sold to consumers passed rigorous and appropriate testing, and the number of ECRs does *not* indicate that the Grenada Classic drives that consumers purchased were defective or unreliable.

#### **C. Response to Hospodor Paragraphs 169-175**

28. In Paragraphs 169-175, Hospodor discusses “ship holds” he claims show that the drives were unreliable.

29. All of the ship holds were for Grenada Classic drives in 2011 and 2012.

30. Hospodor implies that Seagate shipped bad drives to consumers. This is not the case. First, ship holds exist and were triggered to stop products reaching consumers as soon as Seagate identified any potential issues. As explained above, one “trigger limit” that can cause a ship hold is the AFR trigger limit from ongoing reliability testing (ORT). If the tested drives go above the trigger limit, Seagate cannot ship the drives. A few of the ship holds Hospodor cites appear to have been caused by ORT (AFR) triggers. These show that Seagate stopped shipment of products in response to this trigger.

1           31.       Second, Seagate could not release products from ship hold unless it had validated a  
2 method to fix the problem or sort out the drives that had the potential issue. There is slight  
3 variability in all manufactured products and their components. Seagate tests and characterizes many  
4 individual components *of each drive* during manufacturing. In many cases, data analysis of failed  
5 drives will show that the problem can be linked to a specific pattern or characteristic of a component  
6 that was recorded earlier in the manufacturing process. For example, part X might have some test  
7 value or measurement that ranges between 0.0039 and 0.0041. Later during ORT testing, we might  
8 see a failure mode and through data analysis determine that the failing drives have part X with  
9 values close to 0.0039. We can then look back to the recorded “parametric” performance and  
10 implement a “parametric sort” or a “paper sort,” meaning we will pull out all drives that have part X  
11 lower than 0.004 and scrap them or fix them, while releasing the drives with “good” part X for  
12 shipment. In the case of AFR triggers, Seagate always requires fixes to be identified that bring the  
13 AFR below the trigger limit before the ship hold is lifted.

14           32.       Third, the information and data Hospodor references is “raw,” pre-fix data. As  
15 explained above, ORT testing is done for six weeks, with drives being added on a rolling basis. The  
16 reported results are “raw,” pre-fix numbers. If a problem is identified and fixed, the drives in testing  
17 at that time will continue to exhibit the issue for the remainder of the test period—another 4-5 weeks  
18 (or longer). So “raw” ORT test results ***do not reflect the population of drives that is shipped to***  
19 ***consumers***, which are the post-fix or post-sort drives.

20           33.       In fact, the entire process of issuing ship holds and validating fixes is to prevent  
21 “bad” drives from reaching consumers. It is particularly ironic that Hospodor takes evidence of  
22 Seagate actively utilizing the ship hold process to claim that it is evidence of the very thing the  
23 process was preventing.

24           34.       In Paragraphs 171-174, Hospodor claims that four ship holds were due to “head  
25 related” issues and one was due to “contamination.” As an initial matter, as discussed below in  
26 paragraph 39, one of the ship holds Hospodor references (# KOR-0191-00) did not relate to the 3TB  
27 (ST3000DM001) drives. Next, Hospodor implies that “head related” issues and “contamination”  
28 issues are all the same type of issue. This is not the case. “Head related” failures are only related in



1 differently. If Hospodor has identified one instance of this, it was almost certainly because Seagate  
2 determined that the issue was specific to OEMs.

3 36. Hospodor's reference to one stop-ship from Hewlett-Packard in Paragraph 175 is not  
4 meaningful. This could have been due to any number of reasons, including HP simply not needing  
5 as many drives as it had anticipated. Dell's concern with "ORT performance" indicates that in fact  
6 some OEMs closely scrutinize and monitor Seagate's testing and reliability processes—which are  
7 the same for disty and OEM drives. As explained above, Seagate reported the results of ORT  
8 testing to several OEMs on a continuous basis. These OEMs monitored and confirmed that  
9 Seagate's reliability testing and results were up to industry standards. Dell might have expressed  
10 "concern" but apparently they did not place a stop-ship.

11 **D. Response to Hospodor Paragraphs 176-180**

12 37. Hospodor's Paragraphs 176-180, including Figures 25-27, relate two of the ship  
13 holds from 2012 discussed above.

14 38. Figures 25 and 26 are from a document (Ex. 9 [FED\_SEAG0009670]) reporting on  
15 the reasons for issuing ship hold KOR-0187-00, which is one of the ship holds Hospodor discusses  
16 in the prior paragraphs related to Grenada Classic drives in early 2012. These figures do indicate  
17 that the test results were above the trigger limits, but that is why the ship hold was issued. Because  
18 of the ship hold, the figures do not reflect drives that are being shipped to consumers. Rather, these  
19 figures contain raw, pre-fix information.

20 39. Figure 27 is from a document reporting on the reasons for issuing ship hold KOR-  
21 0191-00. As explained above, Seagate tested all sizes of the Grenada drives together, and reported  
22 data on all drive sizes as a single group unless there was a reason not to do so. In this case, a later  
23 document explains that further data analysis showed that none of the failures were in 3TB  
24 (ST3000DM001) drives. (*See* Ex. 10 [FED\_SEAG0071085].) Therefore, this ship hold, and  
25 Hospodor's Paragraph 178 and Figure 27, do not relate to the drives at issue in this action.


26 40. In Paragraphs 179-180, Hospodor discusses the same June 4, 2012 results of ongoing  
27 reliability testing (ORT testing) on the Grenada *Classic* drives as he had discussed in his Paragraph  
28

1 84. (See Ex. 4 [FED\_SEAG0026751] at p. 26785.) My response is explained above in paragraph  
2 21.

3  
4 I declare under penalty of perjury under the laws of the United States of America that the  
5 foregoing is true and correct.

6 Executed on this 5<sup>th</sup> day of January, 2018, at Cupertino, CA.

7  
8  
9 Harrie Netel

A handwritten signature in black ink, appearing to read 'H. Netel', is written over a horizontal line. The signature is stylized with a large loop and a long horizontal stroke extending to the right.